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ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purpose for which it was founded thirty-two years ago, the National Geographic Society publishes this Magazine. All receipts from the publication are invested in the Magazine itself or expended directly to promote geographic knowledge and the study of geography. Articles or photographs from members of the Society, or other friends, are desired. For material that the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage, and be addressed: Editor, National Geographic Magazine, 16th and M Streets, Washington, D. C.

Important contributions to geographic science are constantly being made through expeditions financed by funds set aside from the Society's income. For example, immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. So important was the completion of this work considered that four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures, evidently formed by nature as a huge safety-valve for erupting Katmai. By proclamation of the President of the United States, this area has been created a National Monument. The Society organized and supported a large party, which made a three-year study of Alaskan glacial fields, the most remarkable in existence. At an expense of over $50,000 it has sent a notable series of expeditions into Peru to investigate the traces of the Inca race. The discoveries of these expedition form a large share of the world's knowledge of a civilization which was waning when Pizarro first set foot in Peru. Trained geologists were sent to Mt. Pelee, La Soufriere, and Messina following the eruptions and earthquakes. The Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole April 6, 1909. Not long ago the Society granted $20,000 to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

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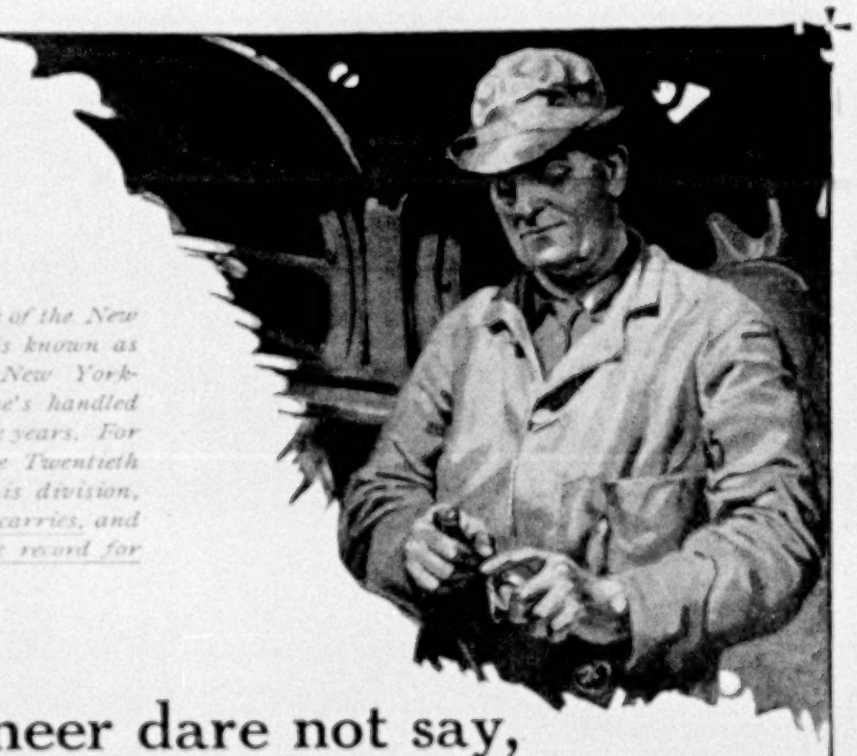

Engineer F. J. Mink of the New York Central Lines is known as "The Chief" on the New York-Albany run, because he's handled a throttle for thirty-one years. For ten years he drove the Twentieth Century Limited on his division, with the Hamilton he carries, and established an enviable record for running on schedule.

An Engineer dare not say, "My Watch was wrong"

A TERRIBLE responsibility rests with the Engineer. The lives of hundreds of passengers depend upon *him*—not just on brakes and semaphore signals.

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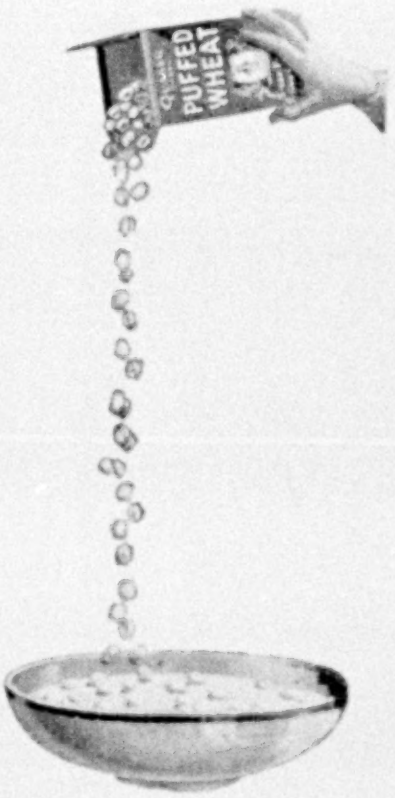


Puffed Wheat

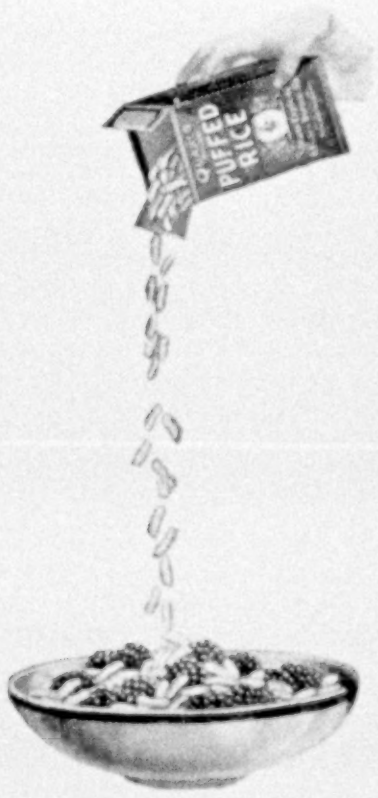
For Your Bowls of Milk

As an ideal food, morning, noon or night, Puffed Wheat is chief of Puffed Grains.

It is whole wheat steam-exploded—puffed to eight times normal size. Every food cell is blasted, so digestion is easy and complete.

It comes to you as toasted bubbles, thin and fragile, with a fascinating taste.

It supplies whole-wheat nutrition in its most delightful form.



Puffed Rice

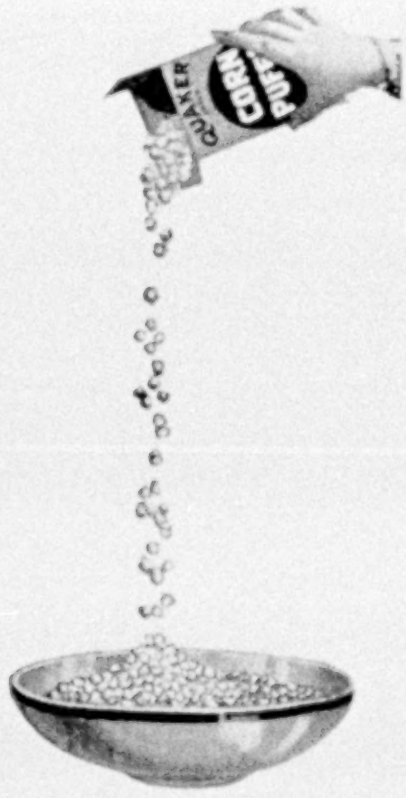
For Berries—For Ice Cream

Puffed Rice is a daintier product, with a taste like toasted nuts.

It is rice grains puffed to airy morsels, thin as tissue. It is a food confection.

Mix it with your berries. Serve with cream and sugar. Use like nut meats on ice cream or in home candy-making.

The texture is so fragile that it fairly melts away, but it leaves a wish for more.



Corn Puffs

For Exquisite Flavor

Corn Puffs is made from hominy. Tiny pellets are super-toasted, then puffed into raindrop size.

It is fairy-like in texture, and the flavor is exquisite.

Serve like other Puffed Grains. Or crisp and lightly butter for children to eat dry.

All these grains seem tidbits, yet all are scientific foods. No other cereals are so fitted for digestion. None makes such all-hour foods.

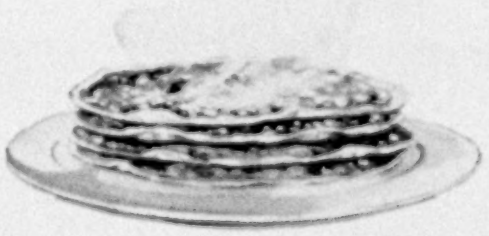
Keep all three kinds on hand.

Puffed Wheat **Puffed Rice**

Corn Puffs

Puffed Rice Pancake Flour

A New Puffed Grain Delight



Such Pancakes as You Never Tasted

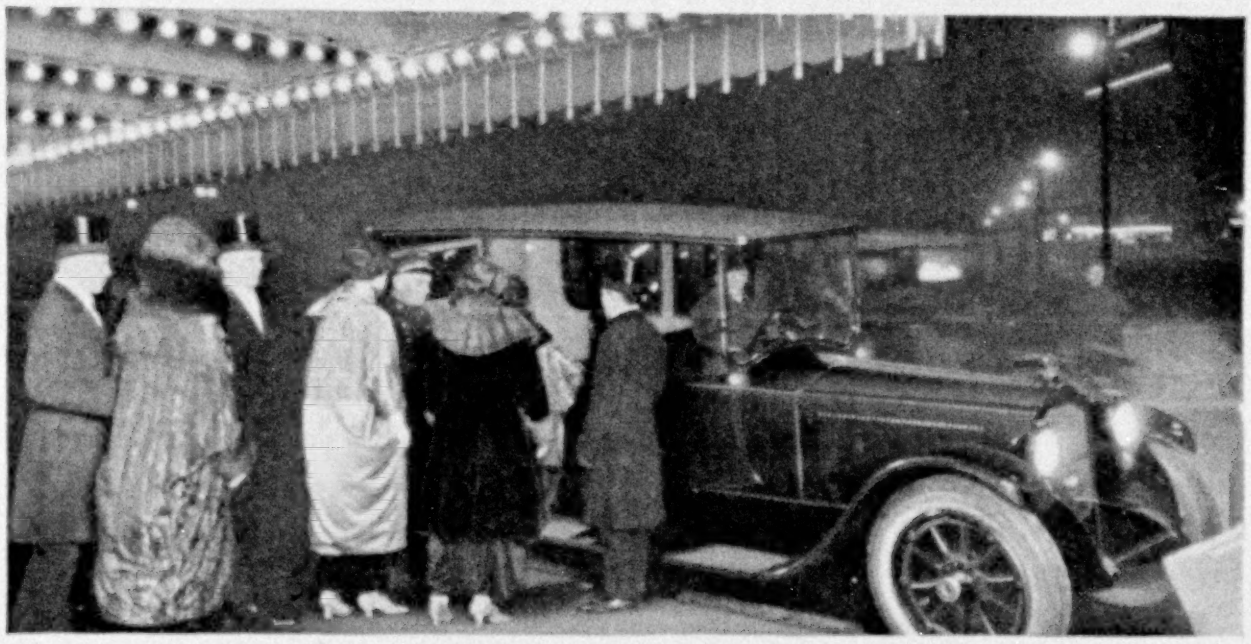
We now make Puffed Rice Pancake Flour—an ideal mixture with ground Puffed Rice. It makes the pancakes light and fluffy, and gives a nut-like taste. Simply add milk or water, for the flour is self-raising, and you'll make the finest pancakes that you ever knew. Try it now.

The Quaker Oats Company

Sole Makers

(3122)

"Henry Wilson! How can you use such perfectly awful language? It's your own fault, anyway, for starting out with that cheap tire when you had a Kelly-Springfield in the garage."



3274 passengers in cars of 31 different makes drove up before this Opera House entrance one evening last month. Many of them are traveling in second-class comfort, not realizing that they pay first-class prices for it.

Does it Really Cost any more to Travel First Class

YOU will often hear people say, with an air of resignation, how much they would rather ride in a Packard, if they could only afford it.

Putting the Packard owner in a *class apart*, with special comforts and privileges—assuming that he pays more for his motoring than they do.

A GREAT many people would be less resigned to their own inconveniences of travel, if they knew how *little* the Packard owner pays for the comfort they speak of.

Packard Transportation never costs a passenger more than second-class transportation—and often *less*.

The *gasoline mileage* of the Packard is from 10 to 14, according to road conditions. The *oil mileage*, 1,000 to the gallon. *Tires*, properly cared for, 10,000 to 16,000 miles.

The Packard exclusive *heat-treating* process adds greatly to the strength of the steel, reducing repairs and depreciation.

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FOR twenty years the Packard Company has been studying motor cars from the standpoint of *Transportation Experts*. Time after time it has proved that trying to save on the initial investment costs a man more in the long run than buying a Packard.

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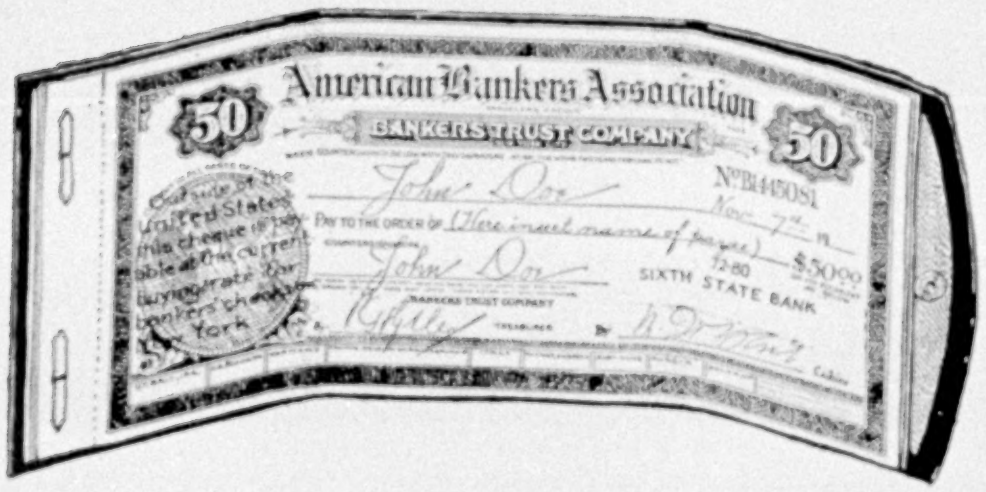
"Ask the Man *Who Owns One"*

PACKARD MOTOR CAR COMPANY, *Detroit*

MANY THINGS HAVE HELPED TO MAKE TRAVEL PLEASANT, BUT NOTHING MORE THAN THIS—



No one thing has contributed more to the pleasure of traveling—in the United States, in Europe, in the Orient or in South America—than the Travelers' Cheques of the American Bankers Association, popularly known as "A. B. A." Cheques.

Imagine yourself in a strange place, far from home, where the banker does not know you and the hotel-keeper is suspicious because somebody recently passed a bogus check on him and where your credit has no standing with the people you meet.

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Write for full information to the

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New York City

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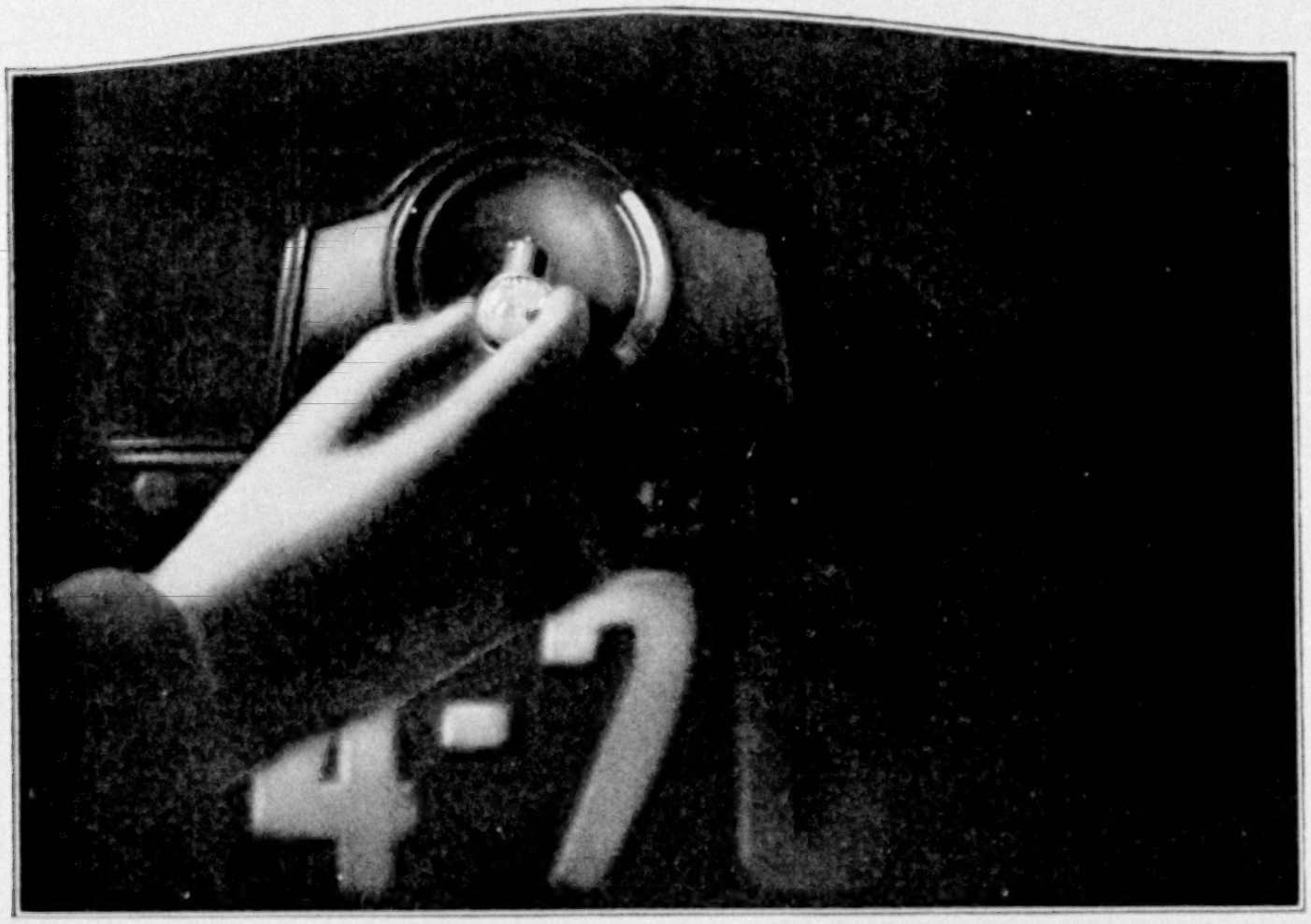

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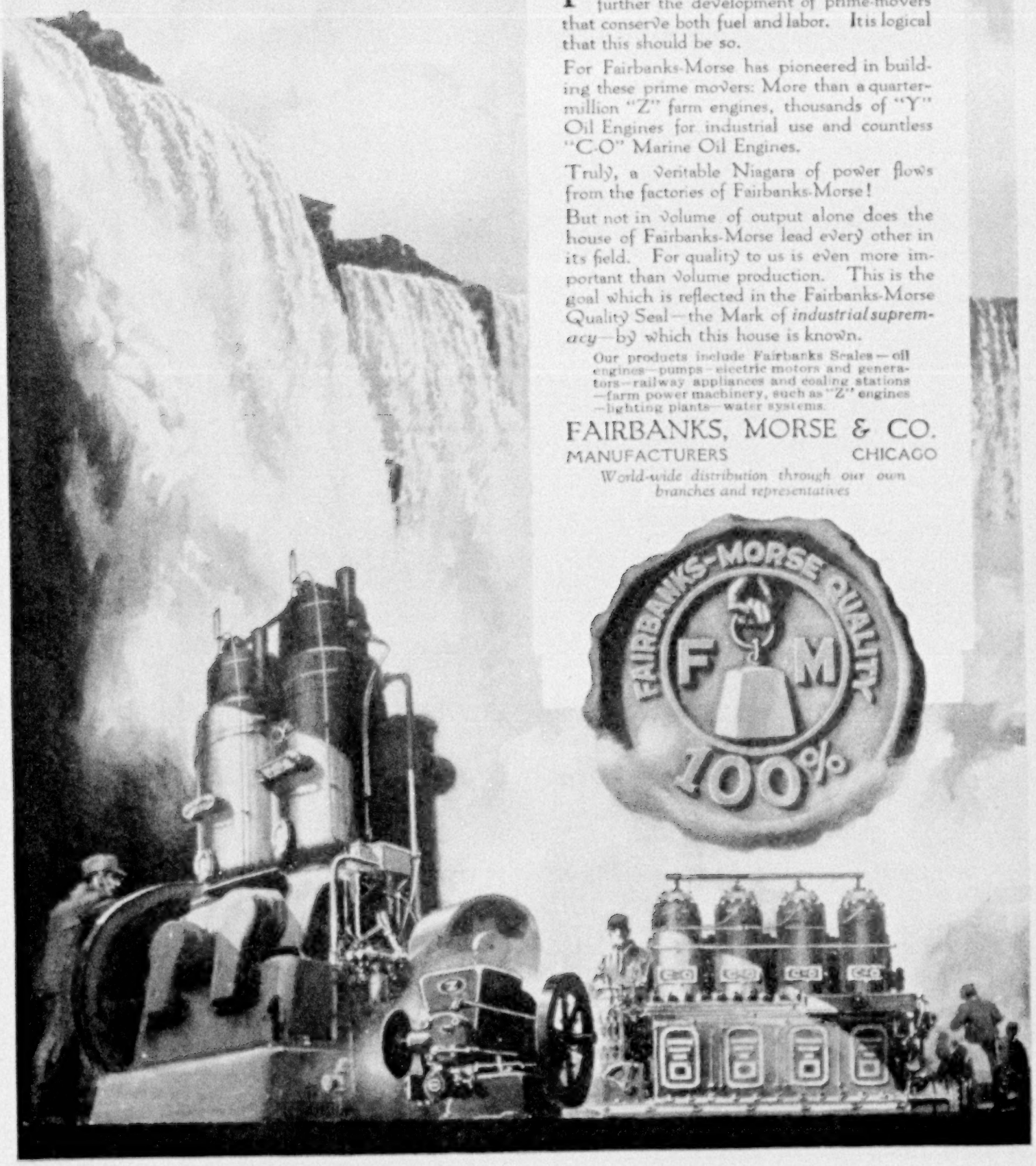

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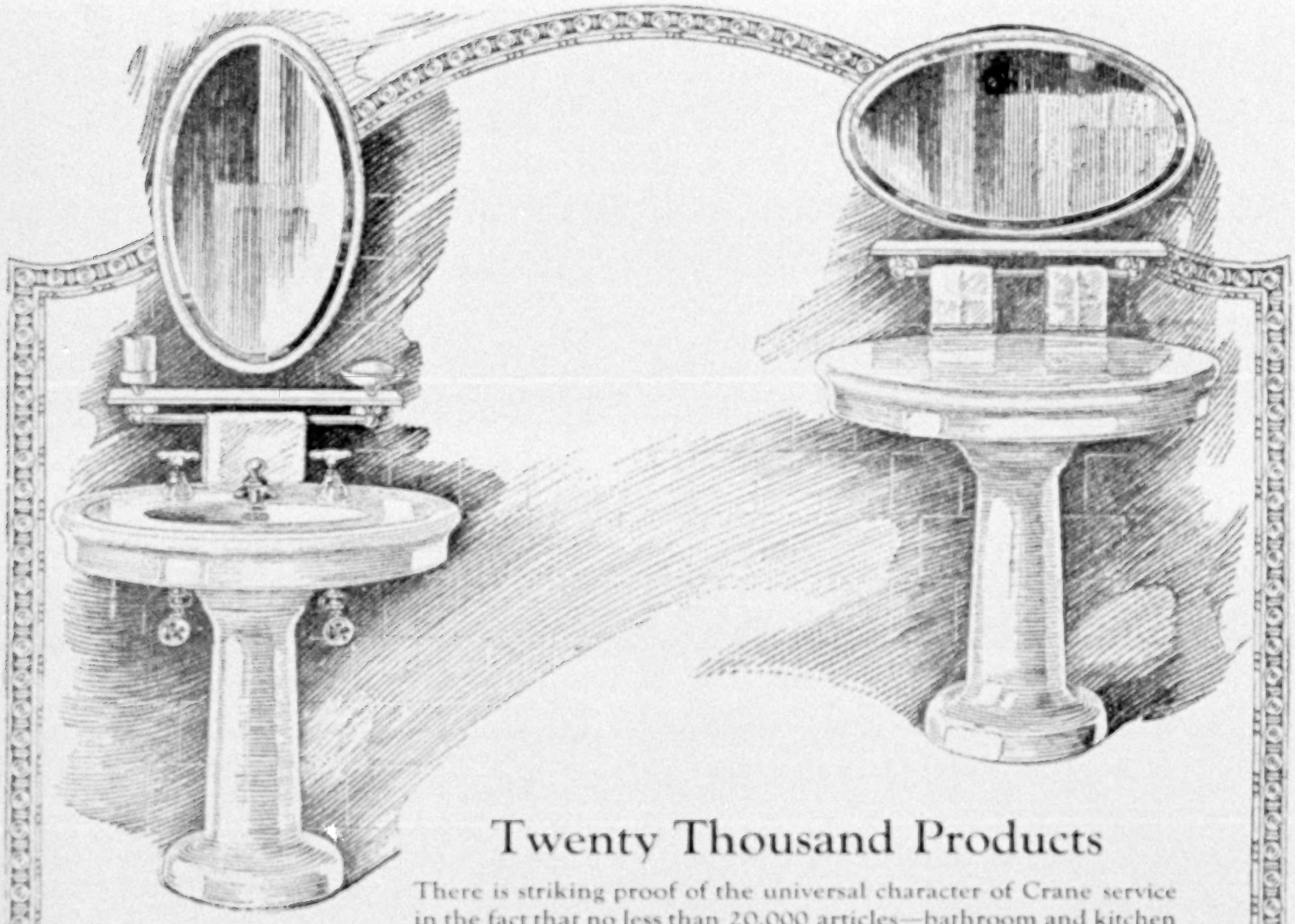

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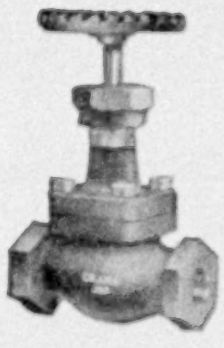

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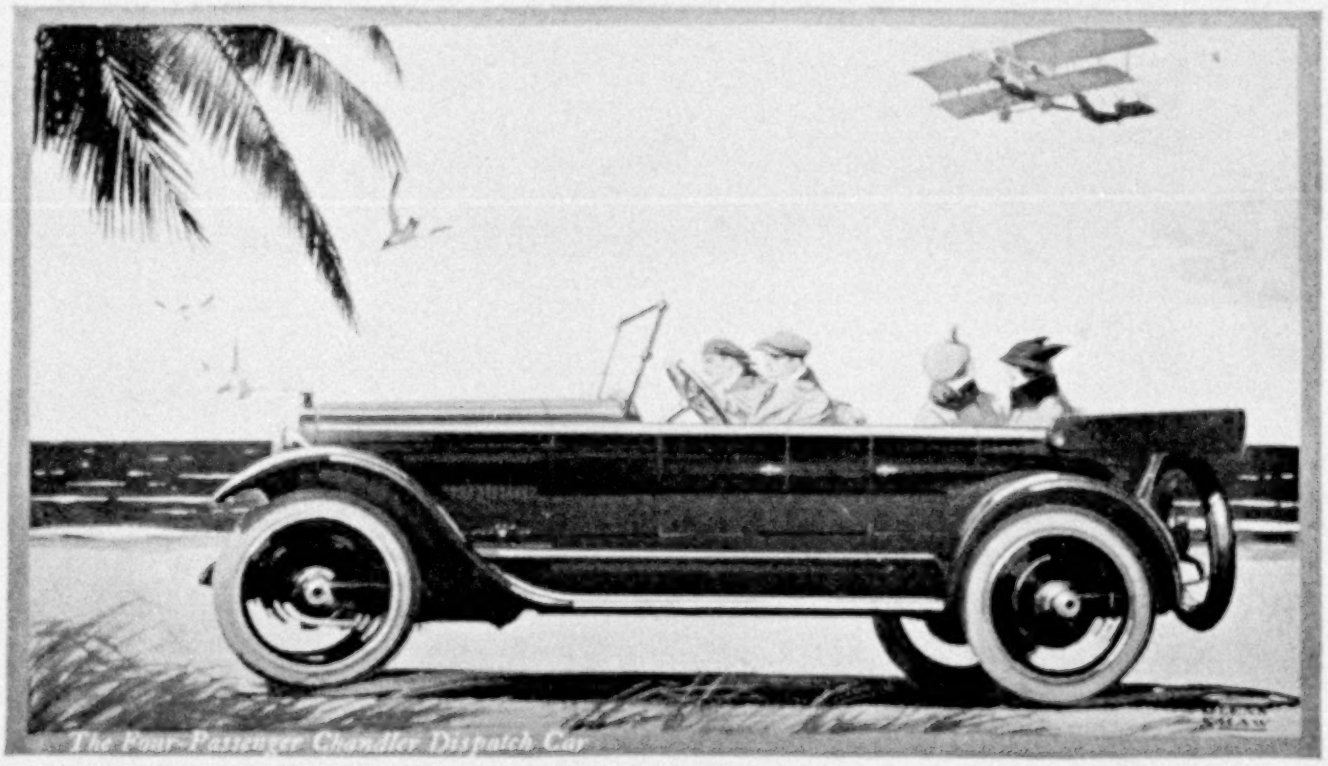
CHANDLER SIX

Famous For Its Marvelous Motor



The Four-Passenger Chandler Dispatch Car

MANY CHOOSE THE CHANDLER DISPATCH

MANY admirers of the Chandler Six choose the Chandler Dispatch. For two years this model has outsold all other cars of the so-called sport type. Its popularity is one of the high spots in motordom.

The new series Dispatch is a snappy, handsome car, seating four adults in perfect comfort. It is of most beautiful design and finish; mounted on the standard Chandler chassis, famous for its mechanical excellence.

You are asked to pay much more for cars which might perhaps be compared with the Chandler. And cheap cars sell for but little less.

SIX SPLENDID BODY TYPES

Seven-Passenger Touring Car, $1895 *Four-Passenger Roadster, $1895*

Four-Passenger Dispatch Car, $1975

Seven-Passenger Sedan, $2895 *Four-Passenger Coupe, $2795* *Limousine, $3395*

(All prices f. o. b. Cleveland)

There are Chandler dealers in more than a thousand towns and cities

CHANDLER MOTOR CAR COMPANY, CLEVELAND, OHIO

Export Department: 5 Columbus Circle, New York Cable Address: "CHANMOTOR"

New Shaving Comfort

Harsh Methods Done Away With

Try This New and Better Way

"Well lathered is half shaved"—an old saying, and true. But well lathered does not mean much hot water and harsh rubbing in. Those old methods open the pores, make the skin tender. Here is a better way. A Free Trial Tube will convince you.

IF you knew of a way to make your daily shave easier, quicker, more comfortable, you would use it. There is such a way. Shavaid provides it. A Free Trial Tube will enable you to prove it to your own satisfaction.

Perfected after many tests and experiments, this scientific preparation accomplishes instantly what the old methods failed to do. One application softens the beard perfectly. It soothes a tender skin.

Makes Shaving a Luxury

Men the nation over are adopting this modern method of easier, quicker, pleasanter shaving. They welcome it as a long needed improvement over old ways. Every man who tries Shavaid once uses Shavaid thereafter.

For Shavaid does away with hot-water applications, with rubbing the lather in. Men have clung to these old-fashioned harsh methods because they have thought they were necessary. They are not. They are injurious to the tender skin.

Softens and Soothes

The soothing, cooling effect is noticeable as soon as you apply it to the dry beard. Then lather. Don't rub the lather in. The lather stays moist and creamy. And as you shave, note how the blade "takes hold" without pulling. That is because the beard is thoroughly softened, prepared as it should be.

No need of lotions or creams after a Shavaid shave. No injury has been done to the tender skin. There is no need for medicaments. On the contrary, your skin is smoother, firmer, healthier from Shavaid's healing influence.

Men who shave close find Shavaid wonderful. The burning, stinging sensation they used to feel after shaving is gone. They know real shaving comfort at last.

It Is Worth Trying

All that is necessary, in order to introduce this remarkable new aid to shaving comfort, is to get men to try it—just once.

No man who shaves once with it will be without it again. For shaving, instead of an irksome task, becomes a positive pleasure.

That is why we want you to send for your Free Trial Tube. Just fill in the coupon and mail it now, before you forget it. When your tube comes, use Shavaid After the trial tube is used up, you can get Shavaid from your druggist at 50 cents a tube. If he hasn't it, we will be pleased to fill your order direct.

Shavaid

Softens the beard instantly
—apply to dry face before the lather.

Saves time and trouble
—no hot water, no "rubbing in" of the lather.

Protects the face
—skin remains firm and smooth.

Removes the razor "pull"
—harsh ways age the skin prematurely.

Replaces after-lotions
—Shavaid is a cooling, soothing balm.

B-B

Shavaid

At Druggists—50c a Tube

BAUER & BLACK, Chicago, New York, Toronto

Makers of Sterile Surgical Dressings and Allied Products

64

Free Trial Tube

BAUER & BLACK, Chicago, Ill.
Mail free trial tube of Shavaid to

Name.....

Street Address.....

City..... *State*.....

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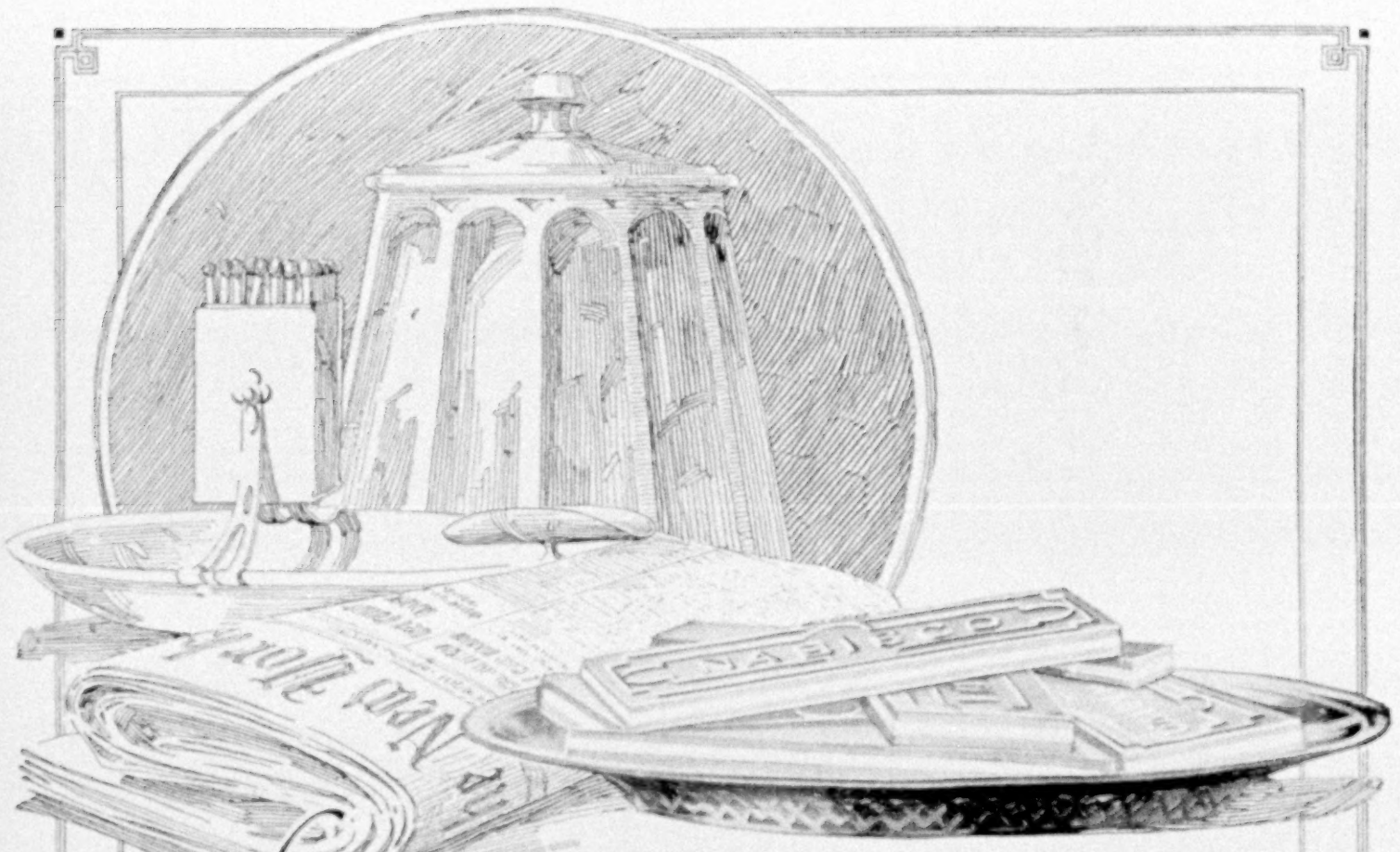
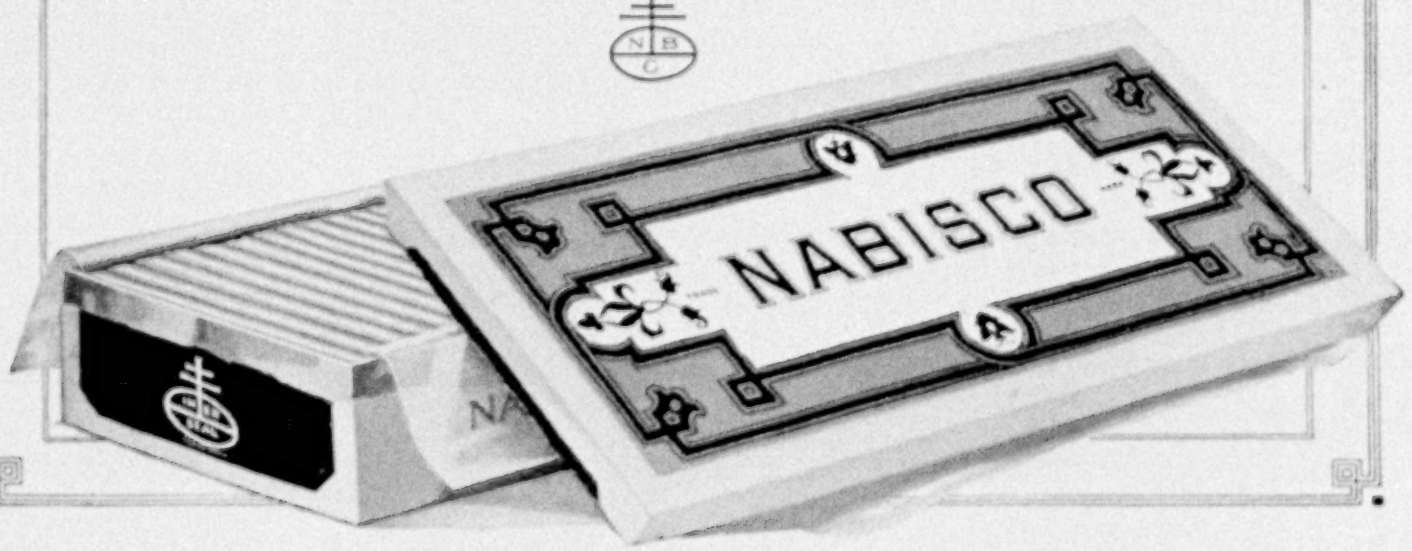


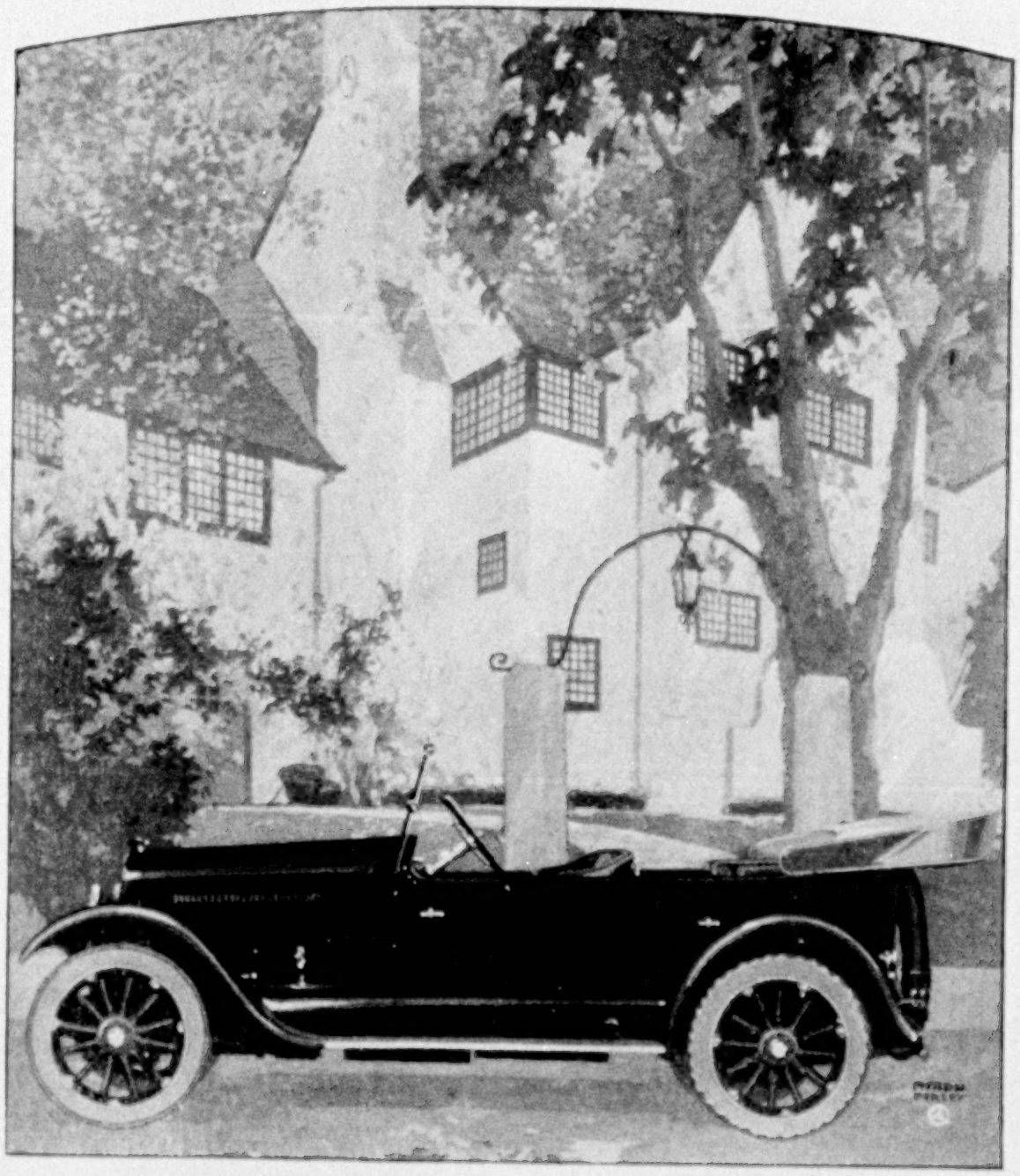
for His Sweet Tooth

BEAR in mind that NABISCO Sugar Wafers appeal to his sweet tooth just as they do to maids and matrons, boys and girls. Remember also that these tempting wafers are as appropriate for between-meal nibbles as they are for formal repasts and all occasions of entertaining.

Sold in the famous In-er-seal Trade Mark package.

NATIONAL BISCUIT COMPANY





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WITH HOT SPOT AND RAM'S-HORN

A HIGHER radiator, a straight cowl, an eminently new and refined body, lower in line, with square doors, deeply tilted seats, a low-hung top, a low windshield, contribute a new elegance to the Chalmers, which a well-nigh faultless chassis has made one of the few great cars of the world, and brought its sales to a new, unprecedented peak.

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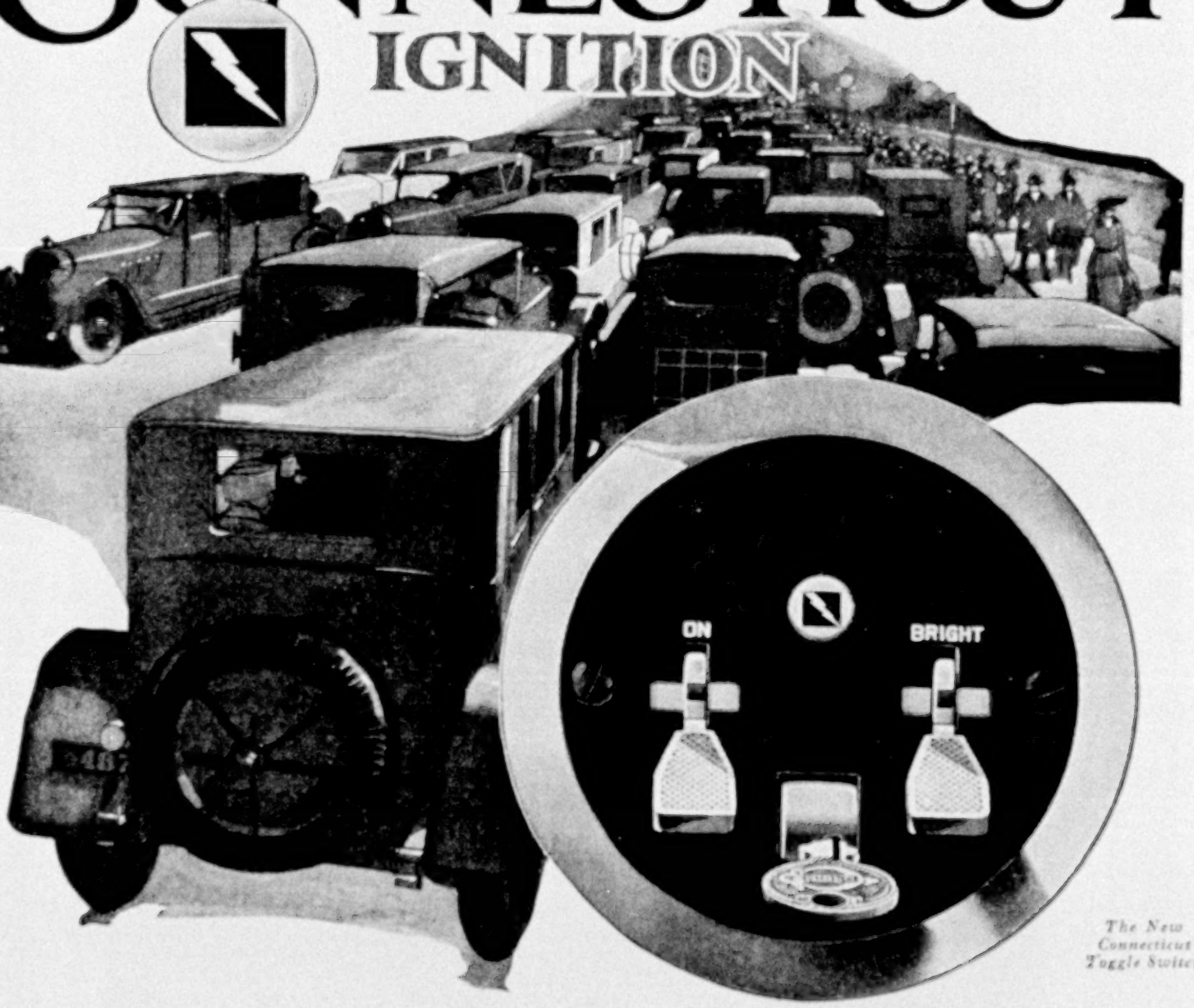


The New Connecticut Toggle Switch

How Connecticut Sparks Prevent Stalling in Traffic

CRAWLING along one minute at a snail's pace, hurrying for a short stretch the next, your motor must keep running, although these pick-ups put a strain on it. To meet this strain every cylinder must fire. The gas mixture in your motor is poor at low speeds. To insure firing you must have a fat spark. CONNECTICUT gives that ample spark, fullest at low speeds—*when needed*—in contrast to the lean spark of the magneto at low speeds.

And you get full benefit of your coil, for CONNECTICUT alone dares use full current. The automatic switch prevents battery drainage.

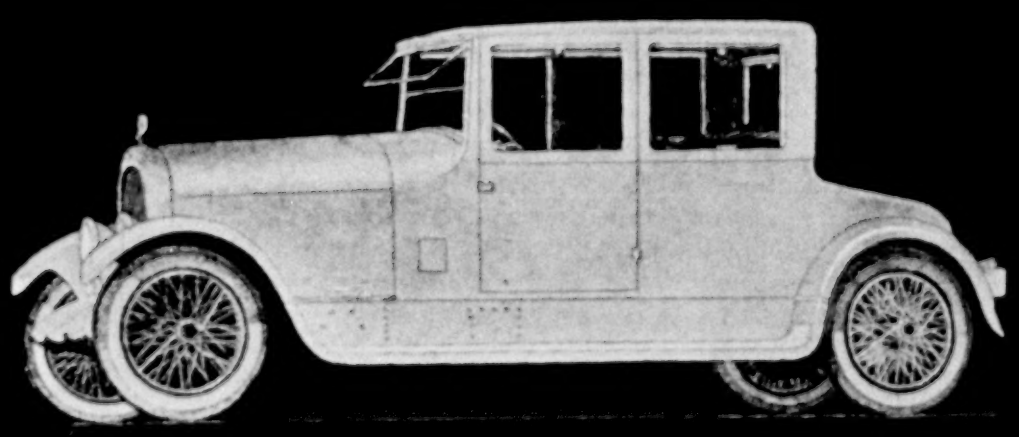
CONNECTICUT TELEPHONE & ELECTRIC COMPANY
Meriden Connecticut

"Mention The Geographic—It identifies you"

MARMON 34

A new smoothness of operation and "sweetness of running"—an ability to give an exceptionally long life of unremitting service—*these* are conspicuous qualities of the new series Marmon 34. And they bespeak the great accuracy of the new Marmon construction methods learned in airplane production during the war.

NORDYKE & MARMON COMPANY
Established 1851 INDIANAPOLIS



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INSURANCE COMPANY

(Incorporated under the laws of the State of New York)

346 & 348 Broadway - - New York, N. Y.

TO THE POLICY-HOLDERS:

Life Insurance has suddenly taken on a new importance. Everybody wants it.

This indicates that the public has begun to understand the economic value of the principle on which life insurance rests, and it also demonstrates the high regard in which our life companies are held.

THE YEAR 1919.

For the New York Life 1919 was in many respects the greatest year in its history.

Our new business ($531,000,000) exceeded the new business in any previous year by nearly $200,000,000. Our new business was written exclusively on the lives of individuals who made application to the Company and does not include any so-called Group insurance.

Our Mortality returned to normal figures, after the heavy mortality from influenza in 1918, which extended through the first four months of 1919.

The Russian Soviet Government by decree made life insurance a government monopoly in Russia and proceeded to liquidate the business of all life-insurance companies, both domestic and foreign. Having by this decree assumed our liabilities, the government took possession of our property in Russia, including our investments, which were chiefly railroad bonds guaranteed by the Russian Government and purchased with moneys accumulated from premiums paid by Russian policy-holders.

With the concurrence of the Superintendent of Insurance of the State of New York, approved by the Convention of Insurance Commissioners of the various States, we have eliminated both Russian assets and Russian liabilities from our statement for the year 1919.

There are no material complications elsewhere in our foreign business.

The decrease in assets at the end of 1919, by comparison with assets at the close of 1918, is due to the elimination of the Russian business and to the fact that in the assets at the close of 1918 there were about $22,000,000 which we had borrowed to purchase Liberty Bonds.

Taking account of these items, the assets in 1919 made a normal increase.

Safety funds increased during the year over $5,000,000.

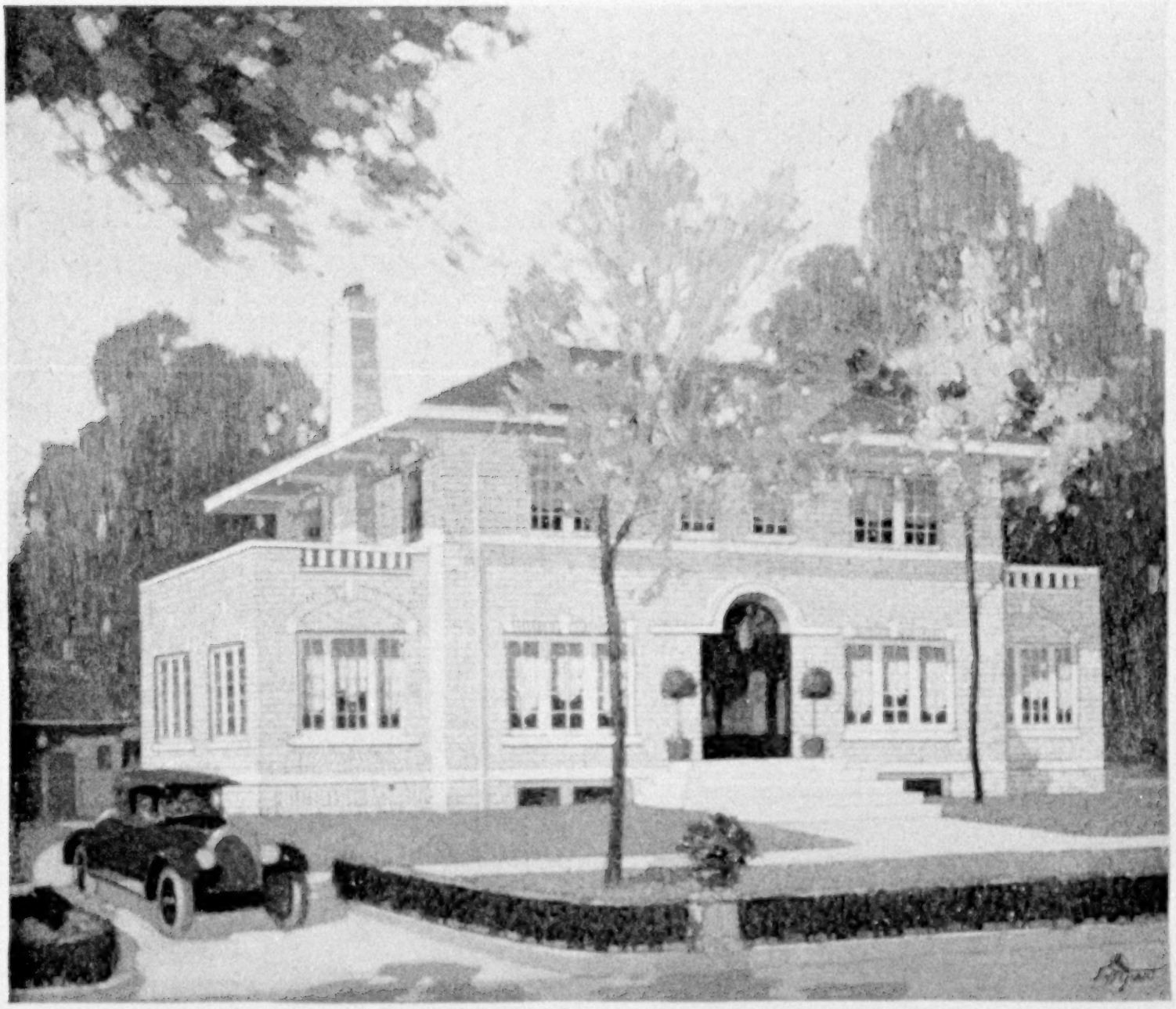
On December 31 our investments in Liberty Bonds and Victory Notes exceeded $100,000,000.

DARWIN P KINGSLEY - - President

Balance Sheet, January 1, 1920

ASSETS		LIABILITIES	
Real Estate	$9,070,481.00	Policy Reserve	$757,098,302.00
Loans on Mortgages	159,869,677.31	Other Policy Liabilities	24,398,333.52
Loans on Policies	145,185,934.77	Premiums, Interest and Rentals prepaid	4,360,124.68
Loans on Collateral	159,000.00	Taxes, Salaries, Rentals, Accounts, etc.	4,991,560.94
Liberty Bonds and Victory Notes	100,605,626.80	Additional Reserves	6,072,091.44
Government, State, County and Municipal Bonds	147,363,654.60	Dividends payable in 1920	32,045,775.56
Railroad Bonds	344,053,661.96	Reserve for Deferred Dividends	88,157,964.00
Miscellaneous Bonds and Stock	8,339,274.69	Reserves, special or surplus funds not included above	43,897,967.91
Cash	20,501,542.64		
Uncollected and Deferred Premiums	13,993,352.96		
Interest and Rents due and accrued	11,849,389.88		
Premiums reported to War Risk Insurance Bureau under Soldiers' and Sailors' Civil Relief Act	30,523.44		
Total	$961,022,120.05	Total	$961,022,120.05

Paid Policy-holders during the year 1919 . . . $116,174,621.00



Painting after House by Jose-Balz Co., Architects

The Economic Advantages of the HOUSE *of* BRICK

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USE FACE BRICK
—it Pays

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An artistic booklet with attractive illustrations and useful information for all who intend to build. The Romance of Brick, Extravagance of Cheapness, Comparative Costs, How to Finance the Building of a Home, are a few of the subjects treated. Your copy is awaiting your request. Send today.

REPAIRS, depreciation, fire-safety, insurance rate and fuel costs are the factors that determine the investment value of your home-building. The savings which the Face Brick house gives you in respect to these factors cancel, in a few years, the slight difference in first-cost over cheaper types of construction. Its beauty, too, has an economic value, in case you ever wish to sell or rent. You will find a full discussion of these matters in "The Story of Brick." Send for it now.

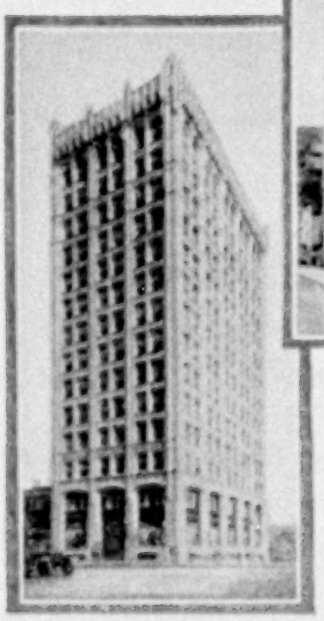
The American Face Brick Association

1137 Westminster Building, Chicago

Texas Co Bldg. Houston Tex.

1st National Bank
Tulsa, Okla.

Commerce Bldg. Kansas City, Mo.



Cosden Bldg. Tulsa, Okla.

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which are aiding in the development of our Great Southwest

HERE are a few of a vast number of buildings which we have erected in recent years to house the many increasing business and industrial activities in the great Southwest.

The nation-wide scope of Fuller Service makes it just as valuable on a job where labor and materials must be brought from a long distance as it is in a closely congested district of a big eastern city.

Thirty years of undisputed leadership in the building industry, during which we have constructed hundreds of millions of dollars worth of buildings throughout the principal cities of the United States and Canada, has given us a wealth of experience that you cannot afford to overlook if you have a large building problem.

To insure the speedy and economical completion of a big building project make consultation with our organization your first step.

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BUILDING AND INDUSTRIAL CONSTRUCTION

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The Old Shoemaker who advised David Lloyd George

He told the young man what few great books were really worth reading. The free book offered below will tell you.

YOU read a speech of David Lloyd George and you say:

"How did he learn to think so clearly and express himself with such power? What college did he attend!"

His college was the cobbler shop in a little village in Wales; his teachers were his uncle the cobbler—and a few really worth-while books.

It was those books, wisely selected for him and systematically read, that gave Lloyd George his start.

Think of this. *You have probably read more books than Lloyd George ever saw in his early years.* Yet your reading has given you only a smattering of knowledge; while his reading gave him the richest gift in the world—the power to think clearly and to express himself well.

WHY not decide today to stop wasting your reading hours? Why not say:

"From now on I will read only the books that will build me into a more successful man or woman; the books that have proved their building power in other lives."

You can do it, if you will. You need not wander aimlessly among the 4,500,000 books that have been printed. Your reading problem has been solved; the solution is contained in a free booklet which every ambitious man and woman should own. It is called "Fifteen Minutes a Day" and tells the whole story of

DR. ELIOT'S
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Out of all the millions of books of Travel, History, Science, Biography, Essays, Drama and Poetry, Dr. Charles W. Eliot, for forty years President of Harvard, has selected four hundred and eighteen and arranged them in fifty volumes.

These books, he says, even if a man or woman will read them only fifteen minutes a day, will give them the essentials of a liberal education.

Books that thrill as they teach

A LIBERAL education—think of it! The power to think clearly and talk interestingly, to be a marked man or woman in any company. And all in exchange for a few minutes of pleasant reading each day.

Here you voyage with the world's great travelers; you see the world's foremost scientists in the laboratories, and the great adventurers in the most thrilling moments.

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To learn how every day's reading—even fifteen minutes—can be used so as to make you a bigger, broader, more interesting man or woman, to find out how you can make yours a growing disciplined mind, the kind of mind that is demanded by modern executives, simply clip the coupon and receive the copy of the free booklet, "Fifteen Minutes a Day," that is wrapped up and ready, awaiting your request.

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Have You Ever Stopped to Think What Business Owes to Christ?

Men thought Jesus Christ a dreamer when He said it—a mystic, wholly impractical.

"And whosoever will be chief among you," He said "Let him be your servant."

To become great by being a servant—it sounds absurd. But is it absurd? Look at the great businesses of America. On what foundation are they built? When they bespeak the good will of the public, what do they say about themselves?

"Our motto is Service. Not our plants or money or salesmanship are responsible for our success. We have made ourselves efficient servants of your health and comfort and happiness, and your patronage has made us great."

The idea of Service was brought into the world by Him; and on that idea modern business is built.

To keep the idea of Service vital and effective in the nation today; to train up the nation's children in its spirit; to carry its message around the world—these are the purposes of the Protestant Churches of North America leagued together in the Interchurch World Movement.

The Interchurch World Movement is the greatest co-operative church program ever undertaken. The feet of the Movement are planted on the solid ground of scientific surveys; its head is lifted high enough to get a vision of the whole world field. Its purpose is to encourage co-operation and discourage duplication; to make every man and every dollar do their utmost in the service of Jesus Christ.

As a business man, the scope and magnitude of this vast enterprise must stir your imagination; surely its purpose and ideals will enlist your support.

You, who have erected your businesses on the Service Idea which He gave you—you are the hope of the Church and the Church is the hope of the world.

Do your part to make the Church a more effective servant. When your church calls upon you give—and give from your heart as well as your pocketbook.

The INTERCHURCH World Movement
of North America

The Protestant Churches Co-operating in the Service of Jesus Christ

45 WEST 18th STREET, NEW YORK CITY

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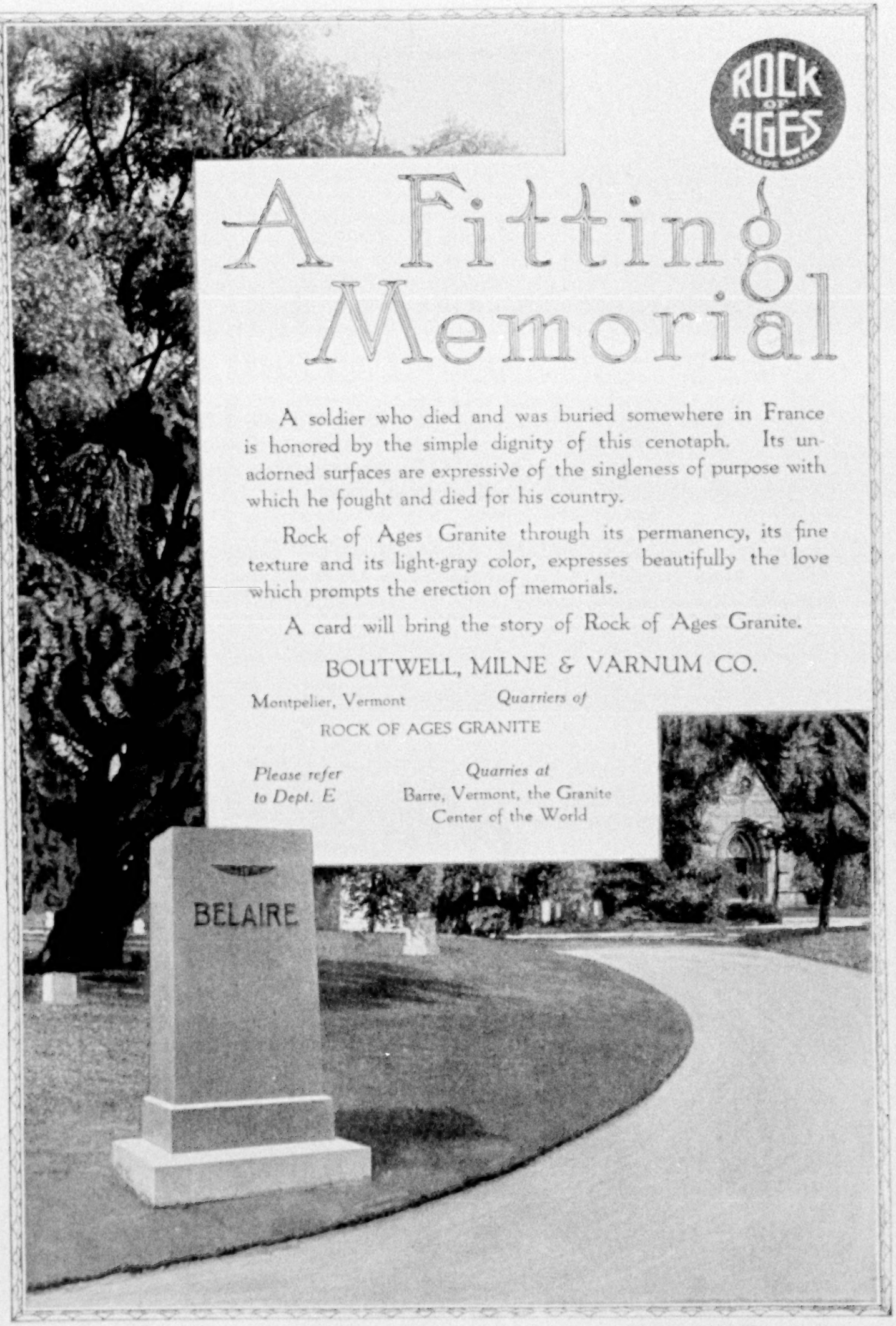

A Fitting Memorial

A soldier who died and was buried somewhere in France is honored by the simple dignity of this cenotaph. Its unadorned surfaces are expressive of the singleness of purpose with which he fought and died for his country.

Rock of Ages Granite through its permanency, its fine texture and its light-gray color, expresses beautifully the love which prompts the erection of memorials.

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HANDY VOLUME ISSUE

War awoke this great land of ours and set the stage for a tremendous industrial, spiritual and social awakening. There probably is not a man, woman or child among the more than 100,000,000 inhabitants of the United States upon whom the past five years has not had a profound effect. Great reforms are being hastened and this will be a better and cleaner world after the ordeals of fire through which it has passed. The participation of the United States as never before in the world's affairs has brought to the people new interests not limited to the neighborhood, town or city in which they live, but interests that are world wide. A miracle has been wrought in men's minds, a miracle in which there is a tremendous thirst for knowledge, a knowledge which is absolutely necessary today, as never before. Where can people find correct, authoritative and comprehensive information on the many different subjects in which they are interested, as a consequence of this awakening? They naturally turn to the wonderful storehouse of knowledge—the world's greatest guide to correct and authoritative information—The Encyclopaedia Britannica. The Britannica furnishes practical, detailed and authoritative articles of great value to the business man, to the manufacturer, to the importer, to the worker in the industries. The Britannica will give a foundation for study of subjects which will be uppermost in our minds for years to come. It is the book for Americans today who are waking up to new thoughts, new work and new interests.

A Complete Library of Knowledge.

But this marvelous work with its 41,000 separate articles is more than a guide for the enterprising business man of the United States, fitting him to be a citizen of the world—a world merchant. The Britannica is a complete library of knowledge on every subject. It discusses in a way that you can understand every branch of science, industry, literature, art, religion, inventions and engineering; history and race development; wars and peace; architecture, astronomy, chemistry, sociology, education, steam, electricity, geology and geography, biography, law and physics. You and your family will find in the Britannica a liberal education. In answer to the hundred questions which every day come to your mind and to your wives' and children's minds—it will tell you more about everything than you can get from any other source.

What Is Before Us?

There are many serious post-war problems confronting us. Do you understand the tendencies in our industrial life? Why are the prices of commodities high? Will wages go still higher or down? Will the cost of living gradually drop? Is there likely to be some great cataclysm that will serve to send prices and wages tumbling downward? Are you inclined to be stampeded with fear of what is before us? Are you sitting down and studying the facts of past cases that were somewhat similar? Are you familiar with what has happened after other wars? In England after the Napoleonic campaigns; in the United States after the Civil War; to France, to Germany and to Neutrals after the Franco-Prussian war?

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Woman Needs the Britannica as Never Before.

The war has changed the status of women industrially and politically. The mother must keep abreast of the great thoughts and movements that are taking place throughout the world, that are vitally affecting her. Woman today in her greater and more important place in the world needs the Encyclopaedia Britannica as never before—she needs it to teach her how to fulfill her new status as a citizen—how to make her more efficient in the business world and, as a mother, to make herself broader and a bigger woman so she can teach her children wisely and correctly.

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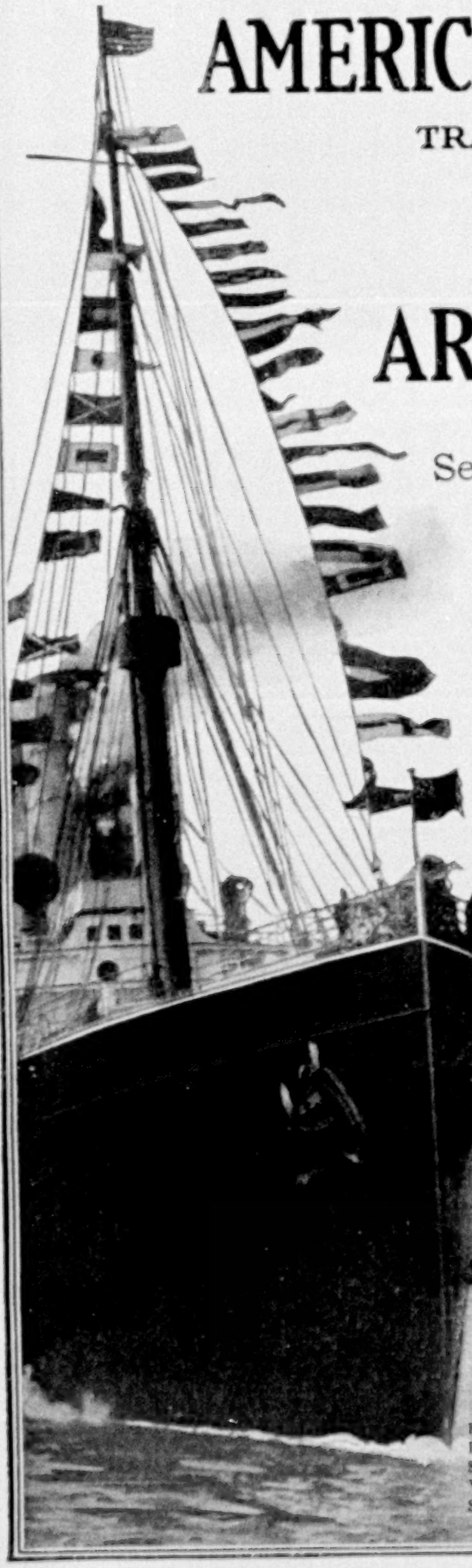

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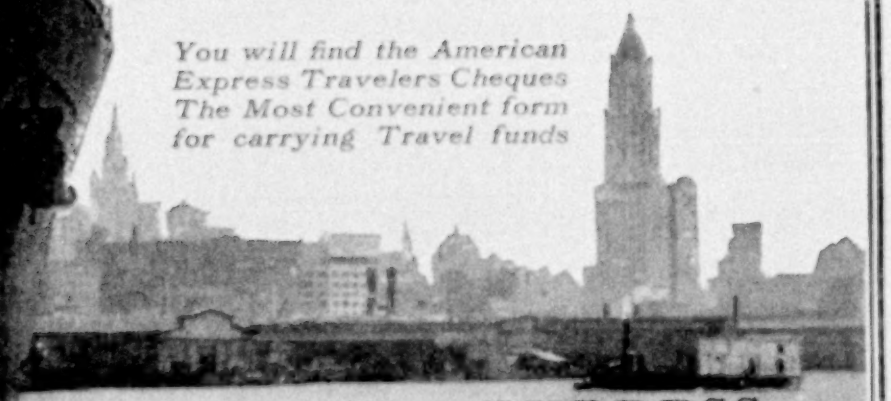

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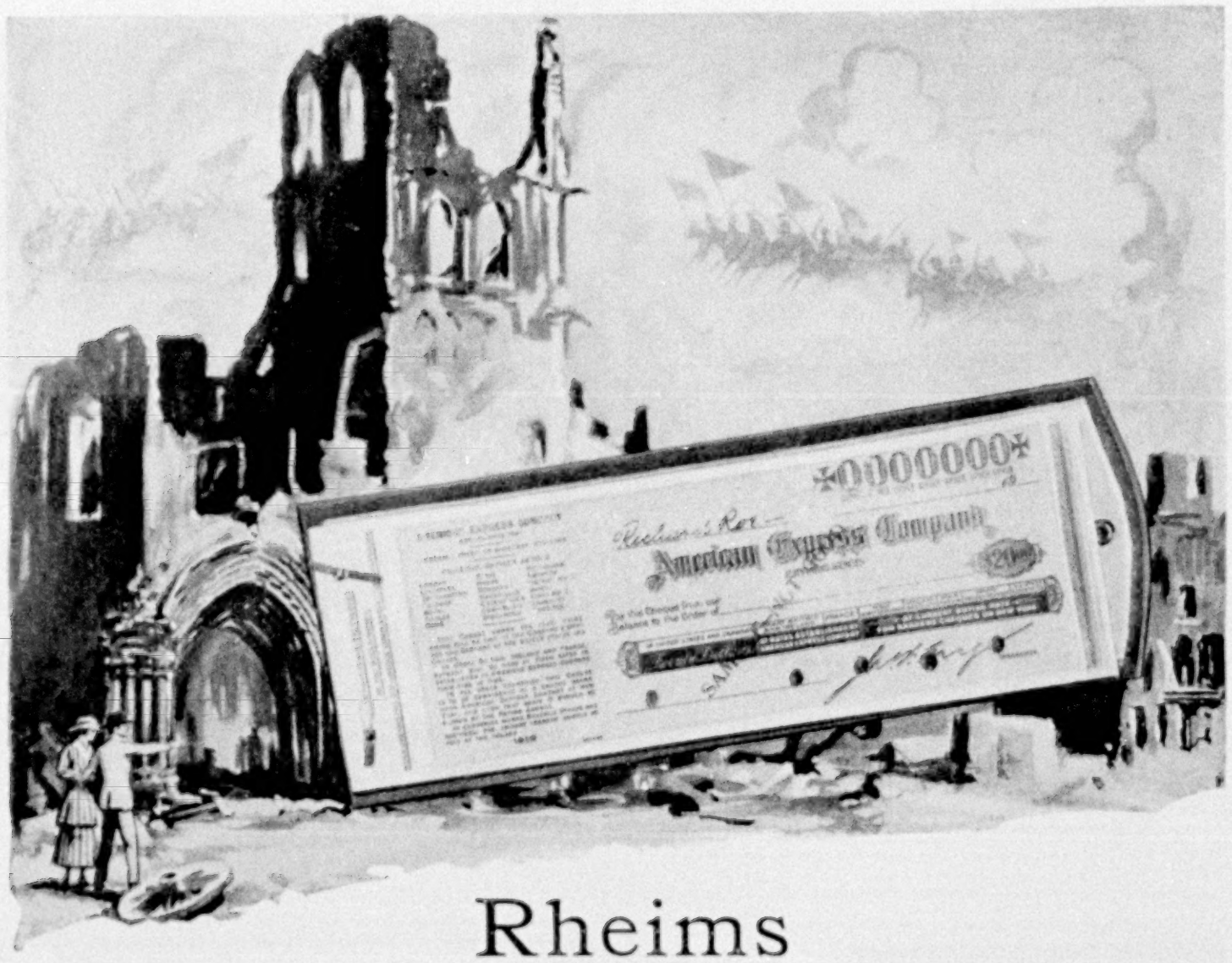
SEATTLE	SAN FRANCISCO	LOS ANGELES
	MONTREAL, CANADA	



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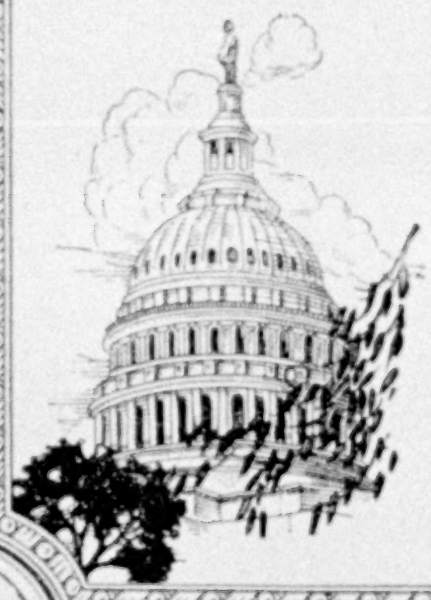

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VOL. XXXVII, No. 4 WASHINGTON APRIL, 1920

THE NATIONAL GEOGRAPHIC MAGAZINE

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PEARY AS A LEADER

Incidents from the Life of the Discoverer of the North Pole Told by One of His Lieutenants on the Expedition Which Reached the Goal

BY DONALD B. MACMILLAN

"STARS AND STRIPES nailed to the Pole!"

The accomplishment of that which had been declared repeatedly to be the impossible, that which our strongest nations had striven to do for more than three hundred years, at the cost of many lives and the expenditure of millions of dollars, demanded great leadership.

What manner of man was this who persuaded the polar Eskimos to penetrate to the interior of the great *ser-mik-suah*, the abode of evil spirits; induced them to leave their homes and journey seven hundred miles due north; to travel out over the drift-ice of the Polar Sea so far that they declared that they would never again see their wives and children?

What was the secret of that power which he possessed over his white men that, had he wished, they would have followed him through broken ice, would have crossed treacherous thin leads, surmounted pressure ridges, and clung to him until the last ounce of food was gone and the last dog eaten?

We find the key to Rear Admiral Robert E. Peary's character in his reply to the late ex-President Roosevelt upon the presentation of the Hubbard Medal of the National Geographic Society upon the explorer's return in 1906 from the world's record of "Farthest North," when he said:

"The true explorer does his work not for any hopes of reward or honor, but because the thing which he has set himself to do is a part of his being and must be accomplished for the sake of its accomplishment.

"To me the final and complete solution of the polar mystery, which has engaged the best thought and interests of some of the best men of the most vigorous and enlightened nations of the world for more than three centuries, and which today stirs the heart of every man or woman whose veins hold red blood, is the thing which should be done for the honor and credit of this country, the thing which it is intended that I should do, and the thing that I must do."

Here we have energy, purpose, determination, and love of country—some of the essentials of a great leader, and as such we who had the honor of serving under him like to think of him, and such we know he was.

DEFYING THE GODS OF THE FROZEN SAHARA

On the 15th of July, 1886, far in on the back of the great ice-cap of Greenland, at an altitude of 7,525 feet, lay two

Photograph by Donald B. MacMillan

A MEMBER OF THE MACMILLAN EXPEDITION FINDING PEARY'S CABIN AND RECORD AT THE NORTHERN END OF AXEL HEIBERG LAND, MAY, 1914

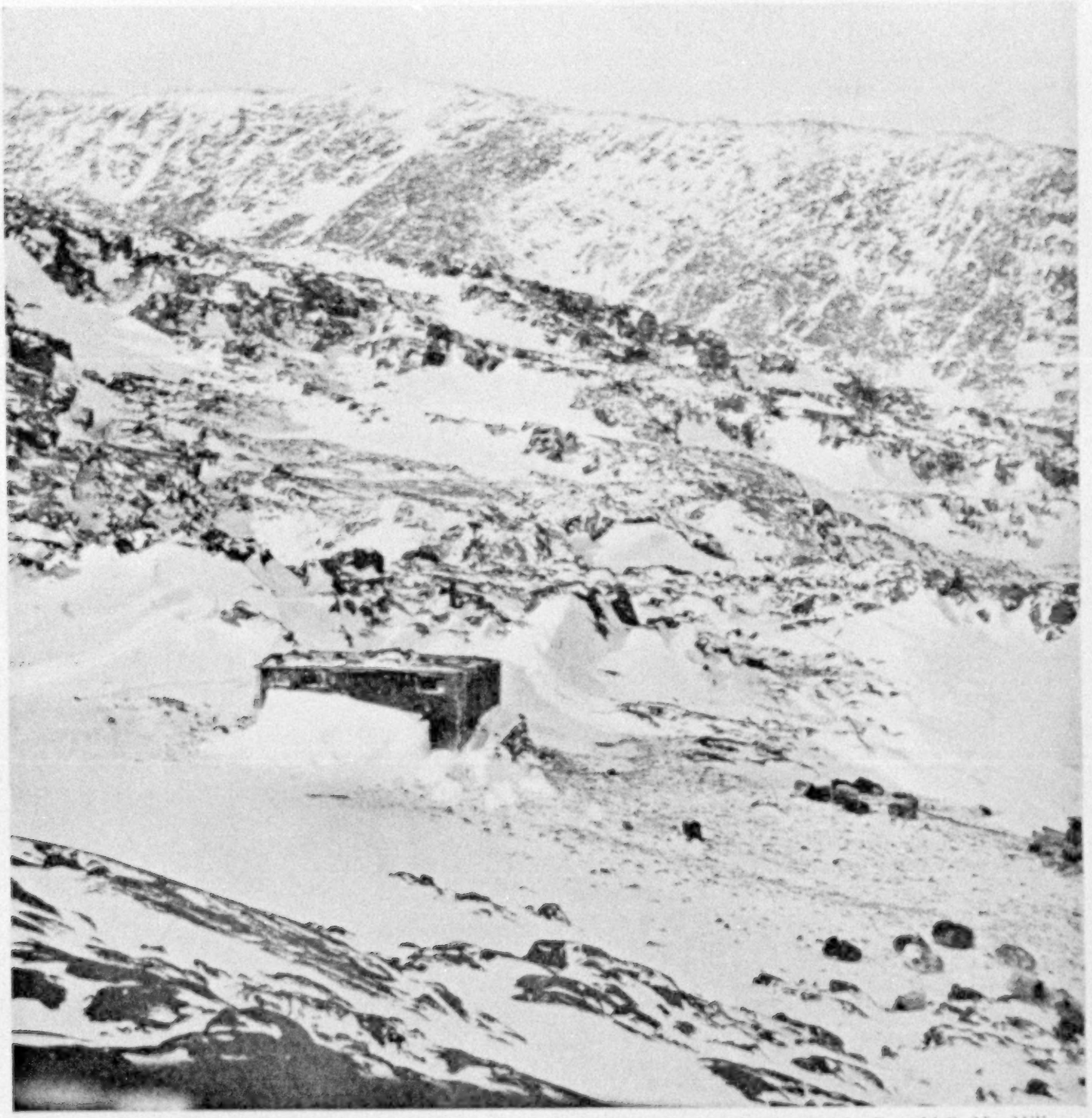
The Arctic explorer reached this point in June, 1906, on his return from "Farthest North," 87° 6′, reached in April of that year (see map, page 297, and text, page 300).

forms huddled in the snow. For forty-eight hours they listened to the sullen roar of wind and drifting snow across their bodies.

The jealous gods of that great frozen Sahara, guarding its secrets down through the ages, were justly alarmed at this invasion and looked in wonder at these pioneers who had the temerity to leave the comforts of civilization and flower-bedecked slopes of the Warm Greenland fiords and advance into the great white unknown, with its attendant severity of cutting winds and drifting snows.

These same gods must have laughed aloud five years later upon seeing a man lashed to a plank and landed upon their shores with a broken leg, far up at the head of Inglefield Gulf. This American explorer would not go home; he would do what he came to do!

And when the ship steamed out through



Photograph by Donald B. MacMillan

PEARY'S HUT AT CAPE SABINE, FROM WHICH THE EXPLORER MADE HIS DASH TOWARD THE POLE IN 1900

This refuge was formerly the deck-house of the steamship *Windward*, used by Peary in his 1898-1902 Expedition.

the broken fields of ice and disappeared over the southern horizon, these gods knew that here in the little tent on the beach was a man against whom immediate warfare must be declared and their strongest forces united (see also p. 319).

"MAN WAS NOT BORN TO DIE BENEATH SUCH A SKY"

At the first peep of dawn of the long Arctic day we find Peary accepting the challenge and assembling his forces at the edge of the ice-cap. On Independence Day the American flag was unfurled at Navy Cliff, some six hundred miles to the north.

When, weeks later, he struggles toward home over that apparently endless white waste, with inflamed eyes, frost-bitten and sunburnt face, dropping dogs, and food nearly gone, he looks up into the clear heavens and declares that

"man was not born to die beneath such a sky."

Here was belief in self, hope, optimism.

Six years later, contrary to all Arctic precedent, he dared to harness his dogs, leave his ship frozen in the ice, and sledge northward in the middle of the big Arctic night.

With the thermometer at fifty and sixty below zero, not a particle of food in his sledges, he groped his way along the eastern shores of Ellesmere Land, around Cape Baird, and into Lady Franklin Bay, searching for the headquarters of the Greely Expedition, abandoned sixteen years before.

He stumbled through the door with both feet frozen to the ankles. Nothing could be done here to relieve his suffering. Toe after toe sloughed off. Finally he was lashed to a sledge and carried through the broken ice of bays and inlets and along the ice foot back to his ship, two hundred miles to the south. And with him, to aid in the amputation of the stumps of eight toes, went a can of anesthetic, found there in the house and brought into the Arctic regions in 1881.

Now a cripple? Within thirty-seven days following the final amputation he was headed north again, equipped with crutches!

The antagonistic elements of the Northland should have submitted meekly and bowed humbly, as this plucky little caravan wound its way up through Kennedy and Robeson channels with the great unknown as its objective point.

FIGHTING FOR THE LIVES OF HIS NATIVES

Two years later we find this intrepid man encamped on the bleak shores of Cape Sabine, surrounded by his loyal Eskimos, patiently perfecting his equipment and preparing for that hazardous trip of eight hundred miles to the top of the earth.

Every attack had been made upon him that Torgnak, the evil spirit of the North, could devise—bitter cold, cutting winds, blinding drift, treacherous thin ice, rough ice, pressure ridges, crevasses, *piblocto* among his dogs, frost-bitten face, fingers, feet, and starvation; yet his will was adamant, his body strong, his purpose unshaken.

And now a new mode of attack to thwart his plans, one cunningly devised and relentlessly executed—deprive him of the valuable services of his loyal Eskimos! Those were the darkest days of Peary's career, fighting not for the Pole, but for the lives of his natives, and with the same energy and determination which characterize all of his work. Six mounds of rock within a few yards of his wooden shack testify to his losing fight.

THE "ROOSEVELT" BEGINS HER CAREER

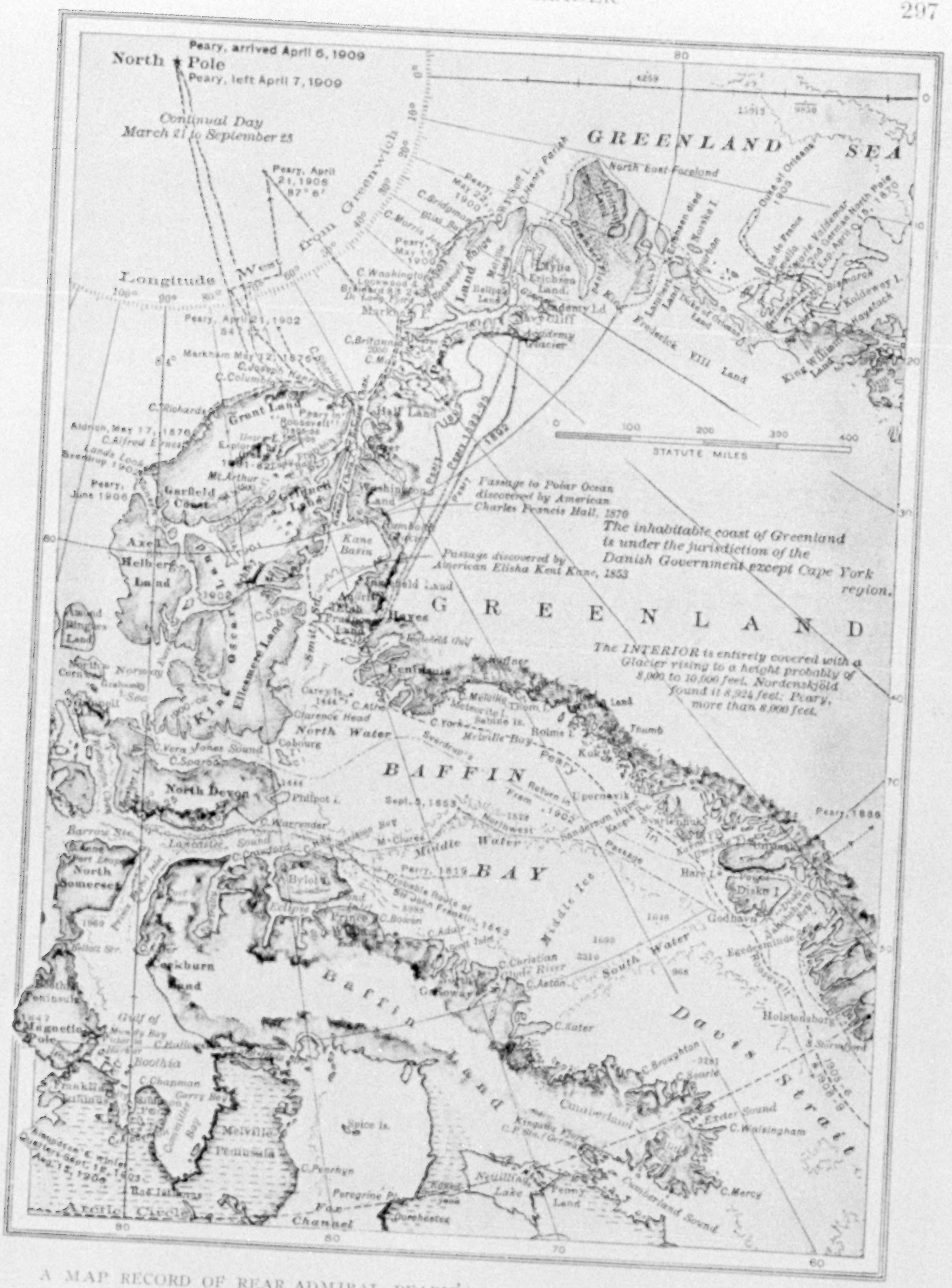
Four years he remained in the North, and returned scarred and temporarily beaten, but with a knowledge of why he was beaten—the secret of final success. His staunch friends believed in him and gathered around him, and in the fall of 1904 they saw the sturdy *Roosevelt* beginning to take shape under the skillful hands of Maine shipbuilders.

With engines throbbing under high pressure and smoke belching from her funnel, Peary and Bartlett fairly hurled this first American-built Polar ship around Cape Sheridan and into the Polar Sea, farther north than any other ship had ever steamed. She had done what she was planned to do; she had justified her existence; and there she lay, on the northern shore of Grant Land, panting like an athlete at the end of the race.

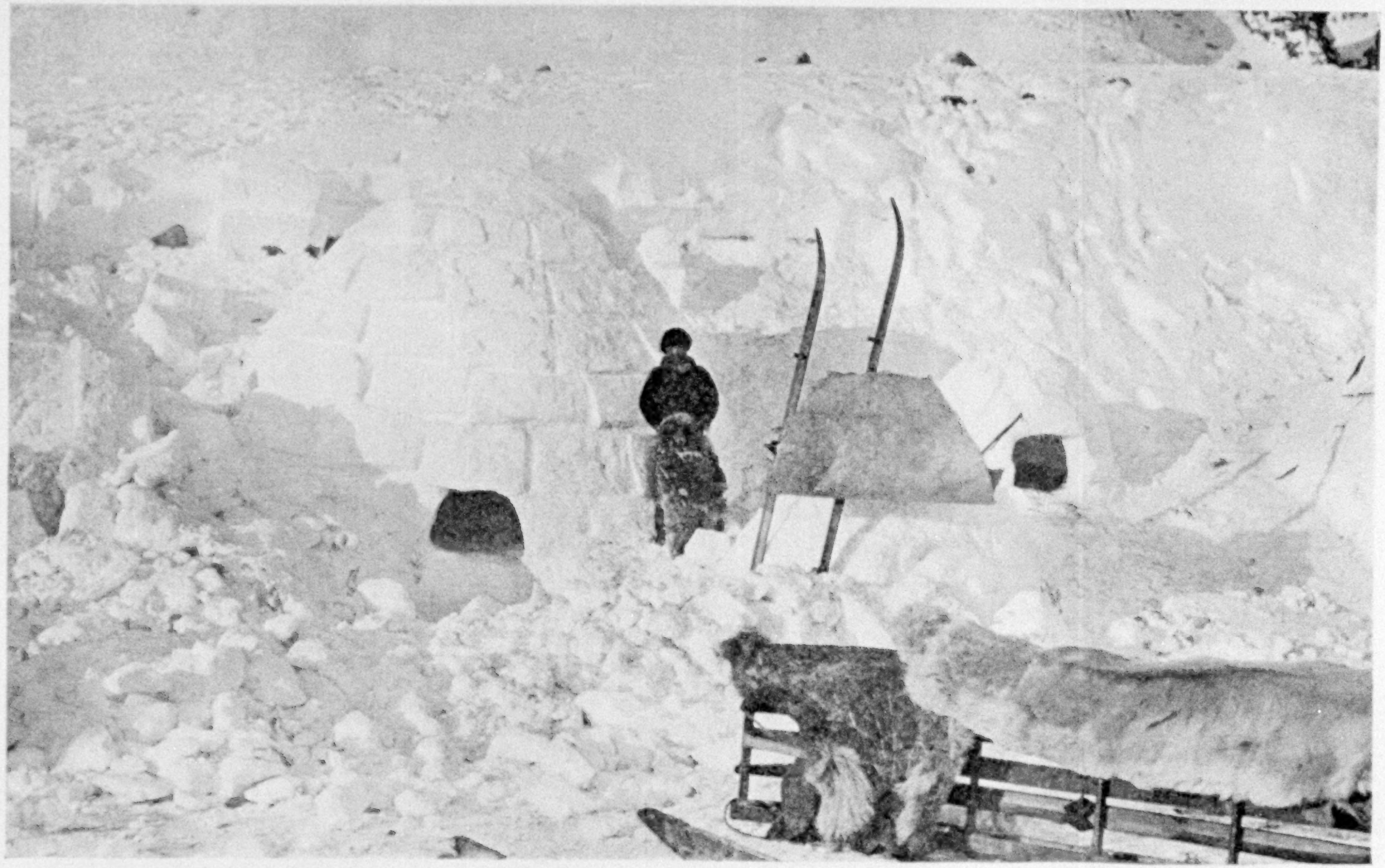
The sun dropped below the hills, darkness crept over the land, and in that great white expanse of snow and ice one thing alone betokened that man lived in what was apparently a world long dead or one unfinished by the hand of the Creator—a warm beam of light from the cabin of the ship.

Long before the sun returned the ninety-mile trail to Cape Columbia was patted down with the feet of more than two hundred dogs. From that point to the Pole the course lay straight out over the drift-ice of the Polar Sea for 413 miles.

"Impossible!" was the word brought back to the British Government by the British North Pole Expedition of 1875-76. Peary never recognized this word in connection with his life's work.



A MAP RECORD OF REAR ADMIRAL PEARY'S 20 YEARS OF POLAR EXPLORATION, FINALLY CROWNED WITH SUCCESS APRIL 6, 1909



Photograph by Donald B. MacMillan

BUILDING A SNOW HOUSE AT PETERAVIK, THE SPRING HUNTING GROUND OF THE SMITH SOUND NATIVE

These are built larger than usual and with considerable care and lined with the summer tupic, for the Eskimos plan to remain here at least a month. The house is shown before the snow entrance has been added.

Photograph by Donald B. MacMillan

ROUGH ICE IN THE POLAR BASIN ABOUT ONE HUNDRED MILES DUE NORTHWEST OF AXEL HEIBERG LAND

An answer to the question why it has taken man more than three hundred years to reach farthest north.

Photograph from Rear Admiral Robert E. Peary

AN ESKIMO SEXTET ON THE MAIN DECK OF PEARY'S ARCTIC SHIP "ROOSEVELT"

"Let there be no doubt as to Peary's popularity in the Far North. Absolutely square and honest in all his dealings with these black-haired children of the Arctic, firm but ever just and kind in all his relations, he remains to them as the great 'Nalegak,' a leader or chief among men" (see text, page 305).

With the ever-repeated "Huk! Huk!" and the snapping of whips, men, dogs, and sledges were swallowed up in the rough sea ice. And again silence reigned along the shore, along the face of the cliff, and in and about the deserted snow village.

PEARY WITHIN 174 MILES OF HIS GOAL

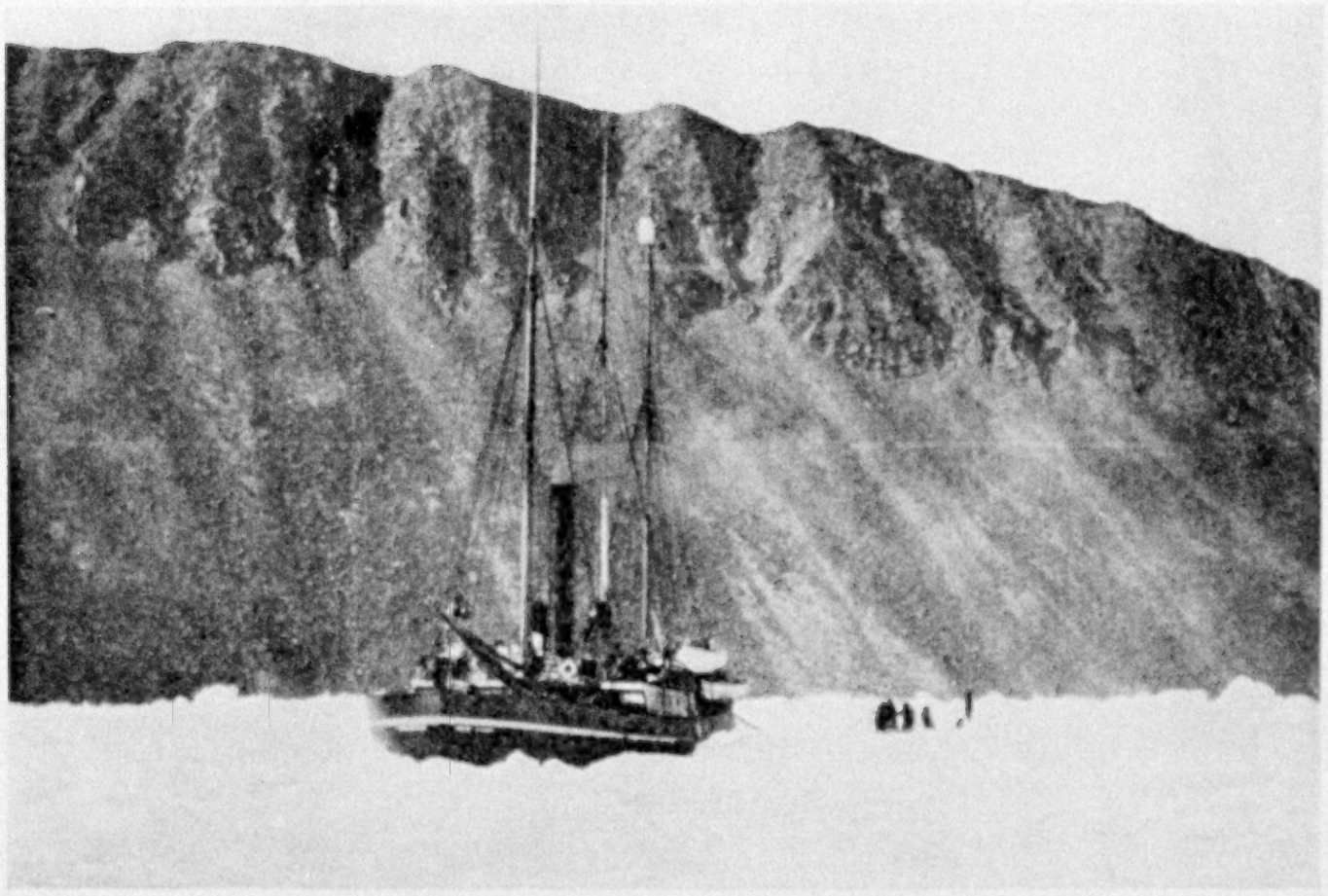
All went well for a few days, which is but a friendly ruse of the Arctic to inspire confidence, and then it happened—a six-day blizzard, obliterating the trail, smashing up the ice of the Polar Sea, scattering and destroying caches of food, and driving all natives, white men, and dogs 60 miles to the east (see map, p. 297).

One by one the various divisions struggled shoreward; but Peary and his men, although knowing that no relief could be expected from the rear, that all food supplies were gone, deliberately turned their backs toward home and their faces toward their objective point and plodded on until they stood at the world's record of "Farthest North," 174 miles from the Pole.

Weeks later that tired little band climbed feebly up over the ice foot on the northern coast of Greenland, burned their last sledge for fuel, ate one of three dogs, and began their long walk back to the ship, frozen in the ice at Cape Sheridan. Within two weeks this indomitable man was heading west along the northern shores of Grant Land, in a thousand-mile trip to the northern shores of Axel Heiberg Island!

Such a journey immediately following such an experience in the Polar Sea was so improbable and apparently impossible so late in the year that many were inclined to doubt Peary's claim to have reached that distant point. Our finding of his record there in 1914* removes all doubt as to his achievement.

* See the records of the Donald B. MacMillan Arctic Expedition, 1913-1917.



Photograph from Rear Admiral Robert E. Peary

PEARY'S ARCTIC SHIP "ROOSEVELT" ICE-BOUND IN ROBESON CHANNEL

The *Roosevelt* was 184 feet long, 35.5 feet broad, 16.2 feet deep, with a gross registered tonnage of 614 tons. The frames of the hull were of oak; the planking was double, yellow pine inside and oak outside. Its engines developed 1,000 horse-power, driving a single eleven-foot propeller. In addition, it carried 14 sails, with a sail area somewhat less than that of a three-masted coasting schooner of the same size.

In 1906 Peary arrived in America, reporting that he had failed to reach the Pole, but declaring that he would make another and last attempt.

NO MISUNDERSTANDING ON THE PART OF PEARY'S ASSOCIATES

What young man with red blood wouldn't follow such a man and spend every ounce of his energy to help place him at the goal of his ambition? Not one who signed his contract in the old Grand Union Hotel in New York expected to go to the Pole; not a man went north for that purpose. Each wanted to do his little and that little his best to place Peary there. Such was our admiration for this great explorer. I write this in answer to the oft-repeated statement that Peary's men were very much disappointed in not being permitted to accompany their commander to his last camp.

We entered upon this enterprise with no misunderstanding. We knew what we were facing, for we had followed him in our reading for years. We knew that this was probably his last attempt, and that he might go beyond the limit of safety, but, if so, then we all wanted to be with him and were eager for the start.

As we steamed along the Labrador coast and out into the ice of Baffin Bay, we began to know our commander and were drawn strangely toward the man whom we recognized as one thoroughly versed in ice technique—a master of his profession. We often recalled the parting words of President Roosevelt at Oyster Bay: "Peary, I believe in you, and if it is possible for man to get there, I know you'll do it!"

We all had this same faith in the man, and now that we saw him in action, that faith was even strengthened.

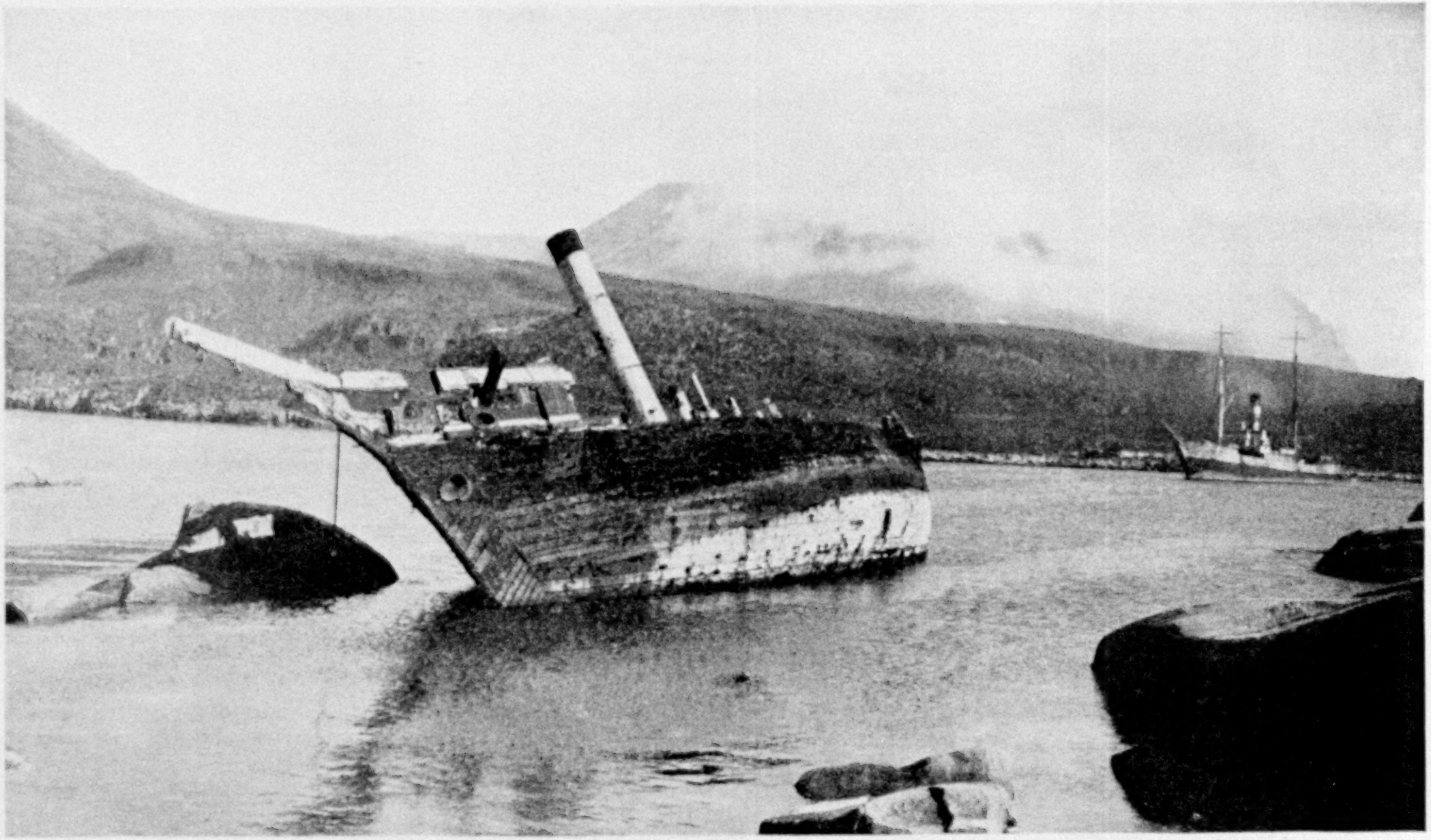
Decks were cleared for our battle in

Photograph by Donald B. MacMillan

SOUTHERN SHORE OF HAKLUYT ISLAND, DISCOVERED BY BAFFIN IN 1616, BUT REMOVED FROM THE MAP FOR TWO HUNDRED YEARS BECAUSE GEOGRAPHERS DISTRUSTED HIS WORD

Upon the island there are many very old stone igloos and stone fox traps. William Baffin was one of the earliest of a long line of British navigators who sought in vain for a Northwest Passage to India. Sailing as pilot of the *Discovery* in 1616, he reached a point 300 miles farther north than his predecessor Davis, and for 236 years his farthest north (about 77° 45′), stood as a record in these seas. Baffin Bay is named in his honor. It was he who named Smith Sound, Jones Sound, and Lancaster Sound in honor of three of his distinguished patrons.

XUM



Photograph by Donald B. MacMillan

A REMINDER OF ONE OF THE GREATEST DISASTERS OF POLAR EXPLORATION: THE STEAMSHIP "FOX" (NOW A DERELICT AT DISCO, GREENLAND), COMMANDED BY CAPTAIN LEOPOLD M'CLINTOCK ON HIS SEARCH FOR SURVIVORS OF THE FRANKLIN EXPEDITION OF 1845

For twelve years following the disappearance of Sir John Franklin's party in the *Erebus* and the *Terror*, the British Government and Lady Franklin continued to dispatch expedition after expedition to find trace of the 129 officers and men who had set out to discover a Northwest Passage to the Pacific. M'Clintock's searching party sailed from Aberdeen, Scotland, in July, 1857, in this little yacht, purchased and fitted out by Lady Franklin with the last of her fortune. He finally brought back to civilization the story of the tragic fate which overtook the whole Franklin party.

THE ONLY MAN BESIDES ADMIRAL PEARY AND FOUR ESKIMOS WHO STOOD AT THE TOP OF THE WORLD

Matthew Henson, the expert colored assistant, had been with Peary since his second expedition to Nicaragua, in 1887, and on all his Arctic expeditions except the first, in 1886. The leader considered him the best dog-driver living, except some of the best of the Eskimo hunters themselves (see page 310).

Melville Bay. Holds were carefully restored; necessary food and equipment made readily accessible; boats supplied with provisions, rifles, and ammunition for a retreat following a possible loss of our ship, and all without a single *order* from the man who has been called tyrant and martinet. To us, his assistants, it was always: "I would like to have you do this"; "Some time today"; "Tomorrow will do," etc. We were amazed, for we did not expect such consideration. Kindness toward his men was apparent at every stage of our voyage.

Borup was summoned to Peary's cabin from the after hold, where he was miserably seasick but pluckily sticking to his job of packing away skins, with now and then a dash to the rail. He returned an hour later, enthusiastic over his visit and over the kindness shown him by the leader of the expedition.

PEARY REVERED BY THE ESKIMOS

Those happy days of wending our way northward in and out between floes and icebergs passed all too quickly. Finally that day arrived when we passed in under the big hills of Meteorite Island and heard the glad cry of those Far North natives upon beholding "Peary-ark-suah" (Big Peary) back again.

Let there be no doubt as to Peary's popularity in the Far North. Absolutely honest and square in all his dealings with these black-haired children of the Arctic, firm but ever just and kind in all his relations, he remains to them as the great "Nalegak," a leader or chief among men.

We can never forget this reception at Cape York—kayaks darting about the ship, the shouts of his former dog drivers, men who had starved with him on the Polar Sea, others on the shore standing at the water's edge ready to grasp the bow of our boat, women laughing, babies crying, and half-grown children with that look of mingled fear and animal curiosity.

How happy they were to see him back and how eagerly and how impatiently they awaited the word to pack their world's goods and transfer all to the deck of the *Roosevelt* for the long voyage northward.

And so it was at every village; the best men in the whole tribe awaited his call—a fact not without significance, in view of oft-repeated statements that Peary was unkind to his native help.

INTO THE HEAVY ICE

Some three weeks later, with decks almost awash and black and fuzzy with dogs and Eskimos, the saucy-looking *Roosevelt* swung around Sunrise Point and into the heavy ice of Smith Sound, her destination the northern shores of Grant Land, far up at the edge of the Polar Sea.

Behind us, upon the shores of Foulke Fiord, was a reserve of coal and food, to which Peary and his men could retreat if their ship was crushed. Such wise precaution was the result of his years of labor in the North and his repeated failures.

The successful negotiation of this last dangerous stretch Peary considered as the crucial link in the long chain of success. That no opportunity for advance should be lost was very evident from his almost constant vigil on the bridge, in the main rigging, or in the crow's nest.

Bartlett and Commander were a perfect team; the former young, intensely energetic, courageous; the latter experienced, cautious, of excellent judgment, constantly advising and holding his captain in check.

No braver man ever trod the quarter-deck than Bartlett. I sometimes think that Bob would rather lose his ship for the pure love of the fight southward in the drift-ice or in open boats than sail into port with his charge staunch, trim, and unscarred.

FARTHER NORTHWARD THAN ANY OTHER SHIP EVER STEAMED

Together they drove their ship farther northward than any other ship ever steamed. Boats were ready for immediate launching; food lined the rail; emergency bags were packed.

Once in our winter quarters, Peary again displayed his qualities of leadership by removing from the ship everything absolutely needed for the attainment of the Pole and the retreat southward, if the vessel should be crushed, carried away by the ice, or burned.

In spite of the loss of the *Roosevelt*,

Photograph by Donald B. MacMillan

THE WINTER HOME OF THE SMITH SOUND NATIVE, THE ROCK IGLOO

The sides are banked with sod, the roof is covered with grass and the summer tent, and lastly with snow, making a very comfortable habitation. Access is gained by a tunnel, some twelve feet in length, which leads to a hole in the floor. The window, which has the appearance of a large striped flag hung against the rocks, is made of the intestines of the seal or walrus. It is translucent, not transparent.

the work would have been carried out as planned. Even houses were built to shelter the large contingent of seventy-five men, women, and children.

MEN CONSTANTLY ON THE MOVE THROUGHOUT THE WINTER

With the Arctic night now coming on, the problem presented itself of how to preserve the health and happiness and good spirits until the time of our departure out over the ice of the Polar Sea, five months later.

At this stage of the battle many a leader has failed because he has not appreciated the full value of work, and necessarily *out-of-door* work, as shown by oft-repeated statement in books on the Arctic, such as: "No work can be done during the darkness of the Arctic win-

Photograph by Donald B. MacMillan

ESKIMO WOMEN AT ETAH CHEWING SKINS

The one on the left is chewing sealskin out of which she will make a pair of mittens. The one on the right is chewing a boot sole in order that she may pass the needle through it more readily and that it may be more comfortable to the foot.

ter"; "It is positively suicide to sledge during the winter," etc.

Peary laughed at such ideas. His men were away with crack of whip and laughter and enthusiasm almost as soon as our keel touched bottom at the edge of the Polar Sea, and they continued to come and go throughout the year, far into the interior of Grant Land, in quest of musk-oxen, caribou, and Arctic hare; for Peary, who never had a single case of scurvy on any of his expeditions, fully appreciated the value of fresh meat as an antiscorbutic.

Fresh vegetables, acids, and fruits are not necessary. This fact we have known for at least a half century, having acquired it from the experience of the American whaling captains when wintering on the shores of Baffin Land and Hudson Bay. Scurvy-stricken patients were always dispatched by them immediately to the igloos of the Eskimos, there to be restored to health by consuming raw frozen meat.

These excursions were not merely to keep us in good health and contentment; every move was directed toward the success of the expedition, geographically and scientifically. There were no schools between decks for the men, as in olden days; no weeks of preparation for farce or drama; no weekly or monthly periodical published; no roped promenade from berg to berg; no long hours in bed between meals.

We were either away with our dog teams among the mountains of Grant Land hunting reindeer, musk-oxen, or Arctic hare or were one hundred miles up or down the coast, living in snow houses, engaged in taking tidal observations, or at the ship working upon our equipment for the Polar dash.

If one word was written large upon the face of every man and upon the walls of every little stateroom in the steamship *Roosevelt,* it was the word *enthusiasm,* which may be translated into good leadership; for we felt our strength

Photograph by Donald B. MacMillan

AL-NING-WA, AGED TWENTY-TWO, WIFE OF ARKLIO, A DOG-DRIVER OF THE MAC MILLAN EXPEDITION, DRESSED IN BLUE-FOX SKINS

and our knowledge in Arctic matters increasing day by day and beheld an equipment being perfected which we knew must win.

Certain items were so far superior to anything yet devised for Arctic work that their value, even to a novice, was obvious. Such were perfected by Peary following years of repeated struggle.

PEARY DEVISED A NEW ARCTIC STOVE

Do not forget the great word *experience*. As an illustration, previous to the 1908 trip the most satisfactory stove for Arctic sledge-work was the so-called Primus, which converts cracked ice at 60 below zero into a gallon of tea in about 20 minutes. Peary reasoned that the more rapid his stove, the more sleep for his men at the end of the long march. He thereupon devised a stove which is so economical in fuel consumption and so quick in its action that many are almost inclined to doubt the fact that we had our gallon of tea in *nine* minutes from the time that the match was applied.

Our clothing, that of the Smith Sound Eskimo, could not be improved upon. Our food was amply sufficient for the maintenance of health and strength. Our sledges were modeled by Peary for the rough ice of the Polar Sea and skillfully fashioned by our master mechanic, Matt Henson. Our equipment was without a doubt the most nearly perfect yet devised for Polar work.

Peary's plan for advance and attack upon the Pole, based upon his experience and failure in 1906, was unique and a large factor in his final success.

From the time when one leaves the northern shores of Grant Land or Greenland, one must depend wholly upon the food on the sledges for sustenance of men and dogs. An occasional bear or seal might be secured, but such would be the exception, as proved by the experience of Nansen, Sverdrup, Captain Cagni, Peary, and every man who has been north of 84°.

To feed Peary and his men until he

Photograph by Donald B. MacMillan

SHOO-E-GING-WA, A LITTLE ESKIMO GIRL OF ETAH, AGED SEVEN

The Eskimo puppy-dogs are the common playthings of the Smith Sound children.

was within striking distance of the Pole and selfsupporting for the five hundred miles of the return trip was the work assigned to the so-called supporting parties under the command of Henson, Bartlett, Marvin, Borup, Goodsell, and myself.

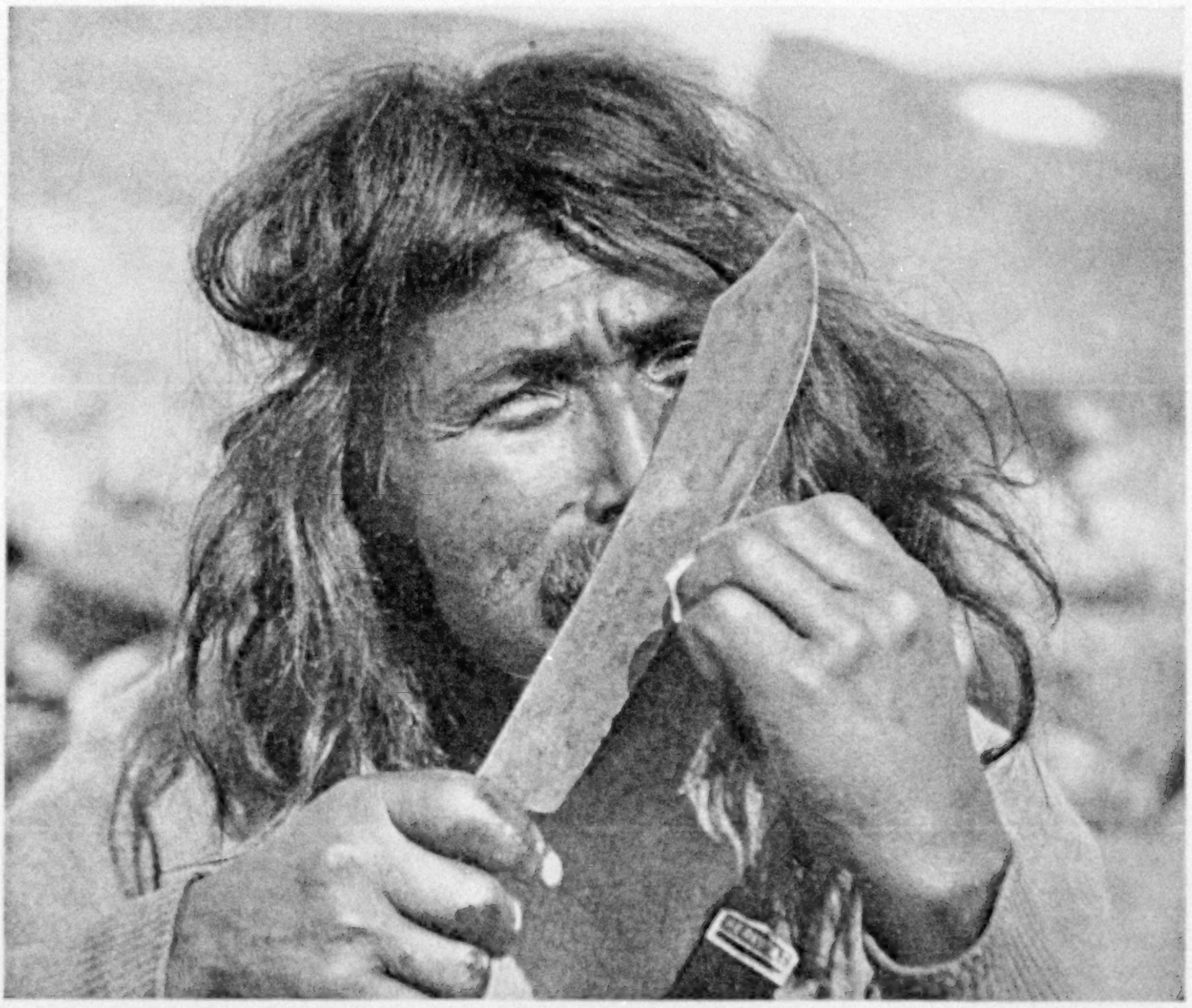
Every five days a white man and his Eskimos were to return to land with an amount of food equal to one-half consumed in the outward trip, with orders to double march, and if held up by open water to eat the dogs. The work of this division was done; it was no longer needed in a task where one's life might depend upon ounces, not pounds; where every additional particle of food is a synonym for miles of travel, and where the last ounce might mean the last mile and success in one's life-work.

AN INSTANCE OF HEROIC SACRIFICE

In general, the American people have minimized the dangers of travel on the Polar Sea and have overestimated the narrow margin of safety of even a small party five hundred miles from land.

The presence of one man not absolutely needed in the work endangers the lives of all, for that man must be fed and must receive an equal amount of the last bite.

Do you remember the brave Oates, of



Photograph by Donald B. MacMillan

AK-KOM-MO-DING-WA EATING MEAT IN THE USUAL MANNER OF THE SMITH SOUND NATIVE

There are no plates and no forks; consequently the meat is grasped in the hand, shoved into the mouth, and cut off at the lips.

the Scott starvation party, who, realizing that his presence meant the loss of all, calmly remarked to his commander, "I am going out for a little while; I may not come back"?

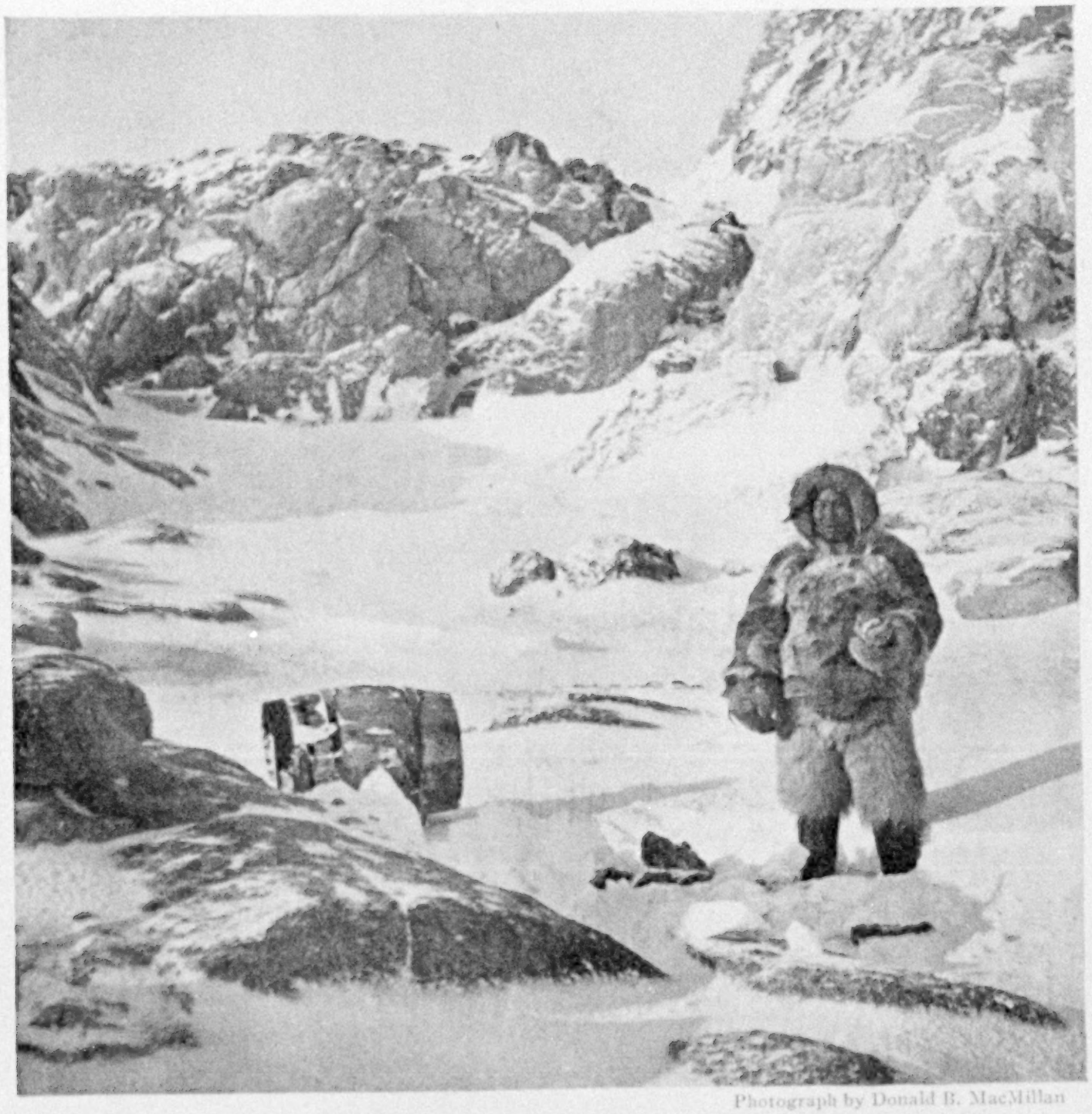
With the dropping of the tent flap and the disappearing of that stumbling frost-bitten form into the swirling snows of the Antarctic ice-cap, there ended the most pathetic and the most heart-stirring scene ever enacted upon the stage of Polar work. All honor to such a hero!

Every white man realized what the success of this trip meant to Peary, and each man knew that the sooner he returned to land after he had finished his work, the better the chances of Peary reaching his goal.

When we heard the words, "You are to go back tomorrow," let me emphasize the fact that every man did so cheerfully and willingly, knowing that it was for the best interests of the expedition. No man expected to go at the start and no man complained at the finish.

Peary owed it to himself, to his friends, to his country, to rid himself of all encumbrances, of all superfluous material, and strip for action. It was his fight now, not ours; ours only just as long as we were needed.

And the negro? He was indispensable to Peary and of more real value than the combined services of all four white men. With years of experience equal to that of Peary himself, an expert dog-driver,



Photograph by Donald B. MacMillan

E-TOOKA-SHOO FINDING, AT CAPE ISABELLA, IN APRIL, 1917, THE MAIL LEFT BY SIR ALLEN YOUNG, OF THE "PANDORA," FOR THE BRITISH NORTH POLE EXPEDITION OF 1875-'76

The packet contained two letters for Captain Nares, of the *Alert*, and one letter for Captain Stephenson, of the *Discovery*.

a master mechanic, physically strong, most popular with the Eskimos, talking the language like a native, clean full of grit, he went to the Pole with Peary because he was easily the most efficient of all Peary's assistants (see page 304).

UNREASONABLE DOUBT CAUSED BY PEARY'S SPEED

Weeks later the little band of six returned, clearly revealing the terrible strain and anxiety during that rapid dash to land over ice fields which threatened to be rent asunder by the high tides of the approaching full moon. In fact, the work was *too* well done, as many a doubt as to Peary's achievement was based upon the time of his return.

During the days of that most unfortunate controversy enough consideration was not given by the public to the following all-important facts:

Photograph by Donald B. MacMillan

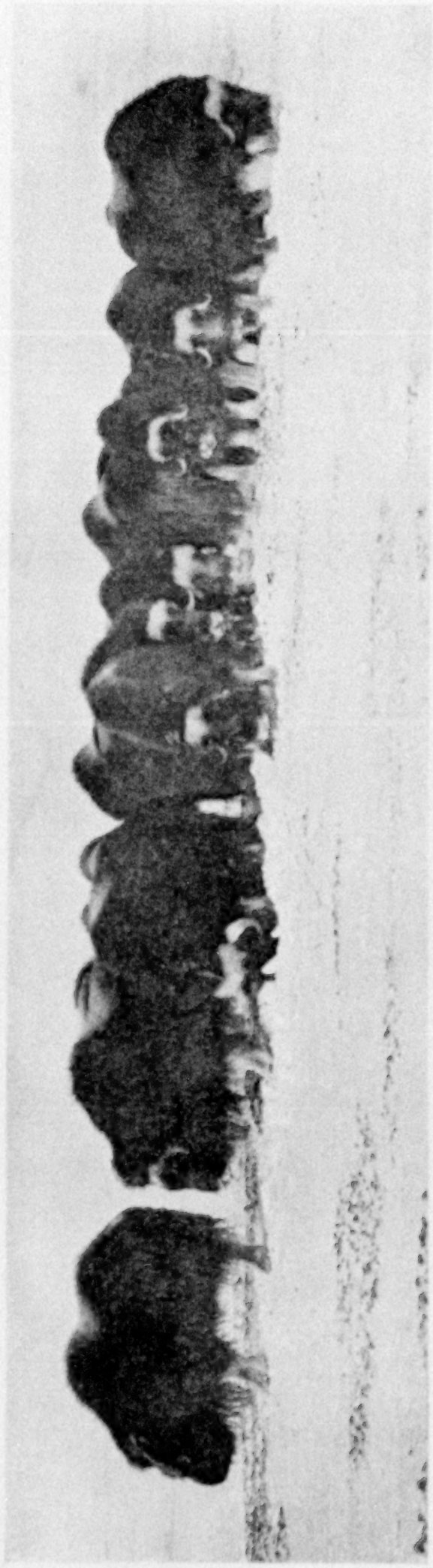
A POLAR BEAR HELD AT BAY BY THE DOGS UNTIL THEIR MASTERS ARRIVE

The polar bear has been called the tiger of the North, but, according to Peary, a contest between one or two, or even three, of these animals and a man armed with a Winchester repeating rifle is an entirely one-sided affair. On the contrary, a contest with a herd of walrus—the lions of the North—in a small whale-boat will give more thrills to the minute than anything else within the Arctic Circle.

Photograph by Donald B. MacMillan

KA-KO-TCHEE-A FEEDING MAC MILLAN'S TEAM AT ETAH, NORTH GREENLAND

On Arctic expeditions walrus are hunted for the purpose of obtaining the maximum of meat for dog food in the minimum of time.



Photograph by Donald B. MacMillan

A LARGE HERD OF MUSK-OXEN ON THE FORSHEIM PENINSULA

A single musk-ox when pursued by dogs will make for the nearest cliff and get his back against it, but a herd will round up in the middle of a plain, with tails together and horns toward the enemy. Then the bull leader will take his place outside the round-up and charge the dogs. When the leader is shot another takes his place.

First. Peary's supporting parties placed him at nearly the 88th parallel.

Second. The observations at this point were taken and signed by Captain Bartlett, of the *Roosevelt*.

Third. From this point on Peary had five well-provisioned sledges, five of the best men of 25, 48 of the best dogs of 250, and only 120 miles to go.

Fourth. The trail to land was well marked and broken ends knit together by the retreat of the various divisions.

Fifth. All expeditions for a half century have double-marched and even triple-marched on the return trip.

How often have I heard the assertion that Peary told none of his men that he had reached the Pole until he learned of Dr. Cook's attainment! Far up on the northern shores of Grant Land, at the edge of the Polar Sea, there stands a cairn, Peary's announcement of the attainment of his life's work, built there *twelve weeks* before we reached civilization. He did not forget his men. The names not only of his assistants, but of every man on board the *Roosevelt*, are written there and placed under glass as a protection against the weather.

PEARY DELAYS NEWS OF HIS TRIUMPH IN ORDER TO HELP ESKIMOS

Upon our arrival at Etah, several weeks later, Dr. Cook's two Eskimo dog drivers, E-took-a-shoo and Ah-pellah, came on board and told us that in company with Cook they had been living down in Jones Sound for nearly a year, and that at no time had they been farther north than a spot which they indicated on the map close to the northern shores of Axel Heiberg Land, distant 500 miles from the Pole.

Naturally eager to steam southward to proclaim to the world the news of his discovery after so

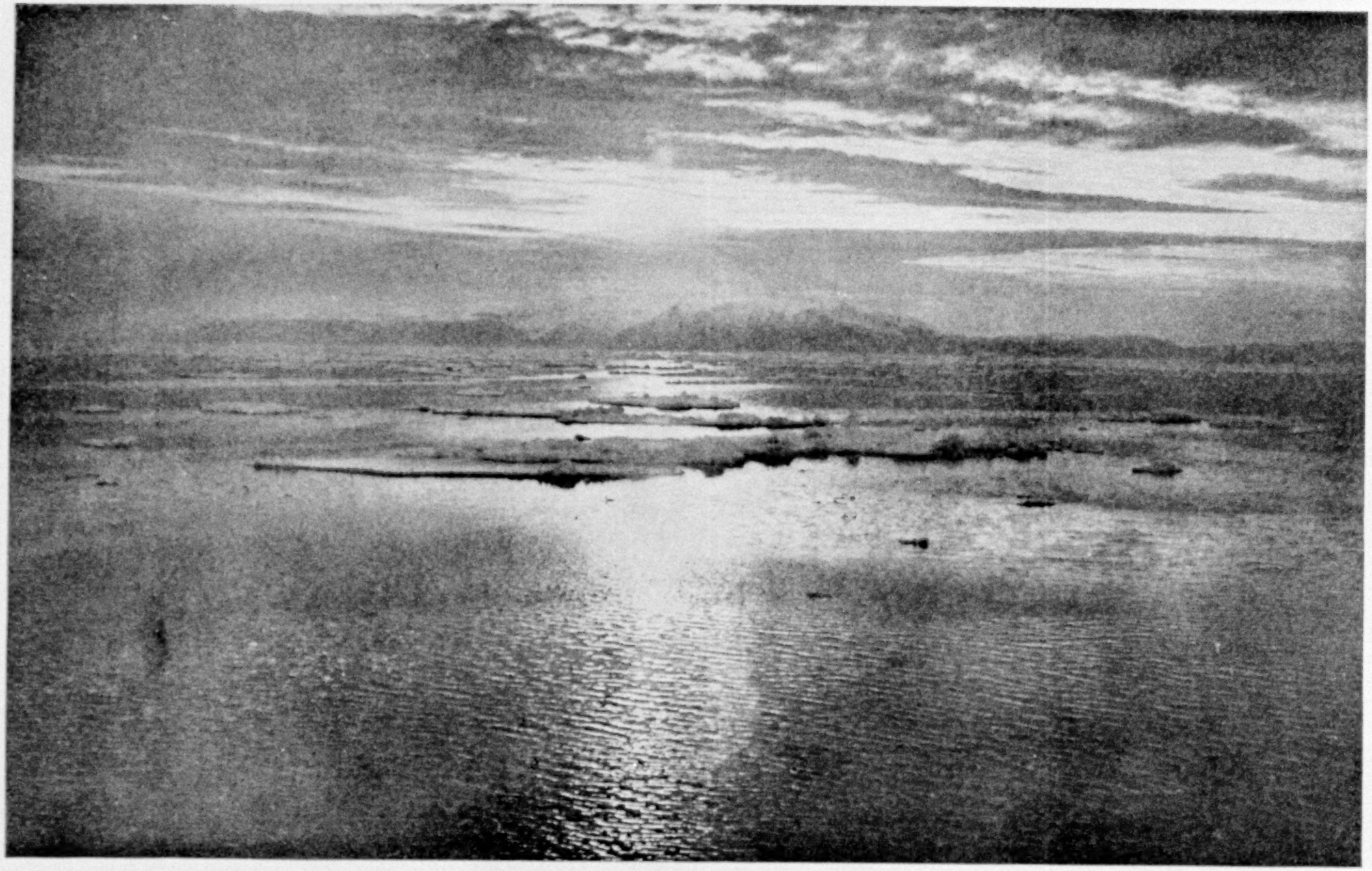
Photograph by Donald B. MacMillan

THE HEAD OF A BULL WALRUS KILLED AT ETAH, GREENLAND

The Atlantic walrus is not as large as the Pacific, but specimens have been secured in Smith Sound weighing 3,000 pounds. On a walrus hunt, which is the most dangerous sport in the Arctic regions, the whale-boats are painted white to resemble pieces of ice, and the rowlocks are muffled, to enable the hunters to steal upon their quarry without detection.

many years of hardship, yet Peary felt that his first duty was toward his Eskimos, those natives who made it possible for him to win out. And there we remained, killing walrus and supplying them with food for the long winter night to come, while Cook was wearing roses and being fêted by kings and queens.

Peary's attitude upon reaching the Labrador coast has been grossly misunderstood. Not only did he not mention his rival's name in his first telegrams, but expressly requested us to refrain from doing so; and this in view of the fact that he knew that an impostor was being proclaimed as the real discoverer. He was not, however, to be permitted to retain this rôle of stoic.



Photograph by Donald B. MacMillan

CLOUD AND SUN EFFECT AT ABOUT ELEVEN O'CLOCK AT NIGHT OVER CAPE SABINE

We steamed southward from Indian Harbor, and upon our arrival at Battle Harbor our Commander was met by a flood of telegrams from the press and from various geographical and scientific societies at home and abroad, all requesting that he give them his honest opinion as to Dr. Cook's achievement.

What should he do?

At this crucial point in his career the average man believes that Peary failed. But the average man has not slept with his back against a sledge at fifty and sixty degrees below zero, with biting winds whipping the snow over his body, dead tired with the day's work; has not crossed treacherous black ice on snow-shoes; has not staggered back beaten to his little hut, followed by one shadow—of a dog; has not returned to home, family, and friends year after year with the one word failure on his lips; has not in the flush of victory seen an impostor bowing to the plaudits of the multitude.

Was his one public telegram in answer to urgent requests too severe in condemnation of one whose claims have since been discredited by every scientific society in the world: "Dr. Cook has handed the people a gold brick. When he claims to have discovered the Pole over his own signature, I shall have something decidedly interesting to say"?

Peary could have shifted the responsibility for that answer upon Captain Bartlett or any of his assistants; but all who know Peary know that the thought of doing so never entered his mind, as he restlessly paced the floor of his little cabin in that northern port.

That bitter controversy is dismissed today with "most unfortunate"!

As we steamed southward on our last lap with this great explorer, we often reviewed the year that had gone so quickly, and our relations with our leader, all so pleasant.

Ever kind and thoughtful and considerate of his young and inexperienced men, he treated them as a father would treat his sons. He helped us lash and pack our sledges, untangled and repaired our frozen and knotted traces.

When struggling along far in the rear, with refractory dogs and heavy loads, an Eskimo would often be detailed to relieve us of a part of our load and pilot us safely across an open lead, and if we arrived with frost-bitten face, it was often the Commander's warm hand that brought the blood back to the surface.

SOLICITUDE FOR HIS ASSOCIATES' WELFARE ONE OF PEARY'S NOTEWORTHY TRAITS

I well remember falling through the ice at 59 below zero. With sealskin boots filled with water and rapidly stiffening clothes, I arrived at our encampment of snow houses. He beat the ice from my bearskin pants, pulled off my boots, and wiped my feet and legs with the inside of his warm shirt. And when covered with blood, a heavy 40-82 bullet having passed through my arm, into my shoulder, and out through the back, and clipping the side of one finger, he remarked: "I would much rather had that thing happen to me than to you!"

This does not sound like "martinet" or "tyrant" or "unkind to his men." His last words to Marvin, lost on the return, "Be careful of the leads, my boy," is characteristic of the man.

Is it any wonder, then, that we as assistants, when we heard the blowing of the whistles of Sydney, N. S.; beheld the line of craft circling out to escort us into the harbor; saw waving flags and docks black with people, should be almost sorry that he had won out?

We knew that never again would we have the honor and the pleasure of serving under such a leader.

Photograph by Charles Martin

PEARY, STEFANSSON, AND GREELY, A TRIUMVIRATE IN POLAR EXPLORATION ACHIEVEMENT

This photograph, made at the Washington headquarters of the National Geographic Society in January, 1919, was the last taken of Rear-Admiral Peary, discoverer of the North Pole, who stands at the left. In the center is Vilhjalmur Stefansson, who had just been awarded The Society's Hubbard Gold Medal for his work in adding 100,000 square miles to the mapped Polar regions of the Western Hemisphere. At the right is Major-General A. W. Greely, leader of the Greely International Polar Expedition of 1881-'84.

PEARY'S EXPLORATIONS IN THE FAR NORTH

By Gilbert Grosvenor

President of the National Geographic Society

THE struggle for the North Pole began nearly one hundred years before the landing of the Pilgrim Fathers at Plymouth Rock, being inaugurated (1527) by that king of many distinctions, Henry VIII of England.

Scores of hardy navigators—British, French, Dutch, German, Scandinavian, and Russian—followed Davis, all seeking to hew across the Pole the much-coveted short route to China and the Indies. The rivalry was keen and costly in lives, ships, and treasures; but from the time of Henry VIII for three and one-half centuries, or until 1882 (with the exception of 1594-1606, when, through William Barents, the Dutch held the record), Great Britain's flag was always waving nearest the top of the globe.*

Immense treasures of money and lives were expended by the nations to explore the northern ice world and to attain the apex of the earth; but all efforts to reach the Pole had failed, notwithstanding the unlimited sacrifice of gold and energy and blood which had been poured out without stint for nearly four centuries.

PEARY'S INTEREST IN THE ARCTIC AWAKENED IN 1886

A brief summer excursion to Greenland in 1886 aroused Robert E. Peary, a civil engineer in the United States Navy, to an interest in the Polar problem. Peary a few years previously had been graduated from Bowdoin College second in his class—a position which means unusual mental vigor in an institution which is noted for the fine scholarship and intellect of its alumni. He realized at once that the goal which had eluded so many hundreds of ambitious and dauntless men could be won only by a new method of attack.

The first Arctic problem with which Peary grappled was considered at that time in importance second only to the conquest of the Pole, namely, to determine the insularity of Greenland and the extent of its projection northward. At the very beginning of his first expedition to Greenland, in 1891, he suffered an accident which sorely taxed his patience as well as his body, and which is mentioned here as it illustrates the grit and stamina of his moral and physical make-up.

As his ship, the *Kite*, was working its way through the ice fields off the Greenland shore, a cake of ice became wedged in the rudder, causing the wheel to reverse. One of the spokes jammed Peary's leg against the casement, making it impossible to extricate himself until both bones of the leg were broken.

The party urged him to return to the United States for the winter and to resume his exploration the following year; but Peary insisted on being landed, as originally planned, at McCormick Bay, stating that the money of his friends had been invested in the project, and that he must "make good" to them.

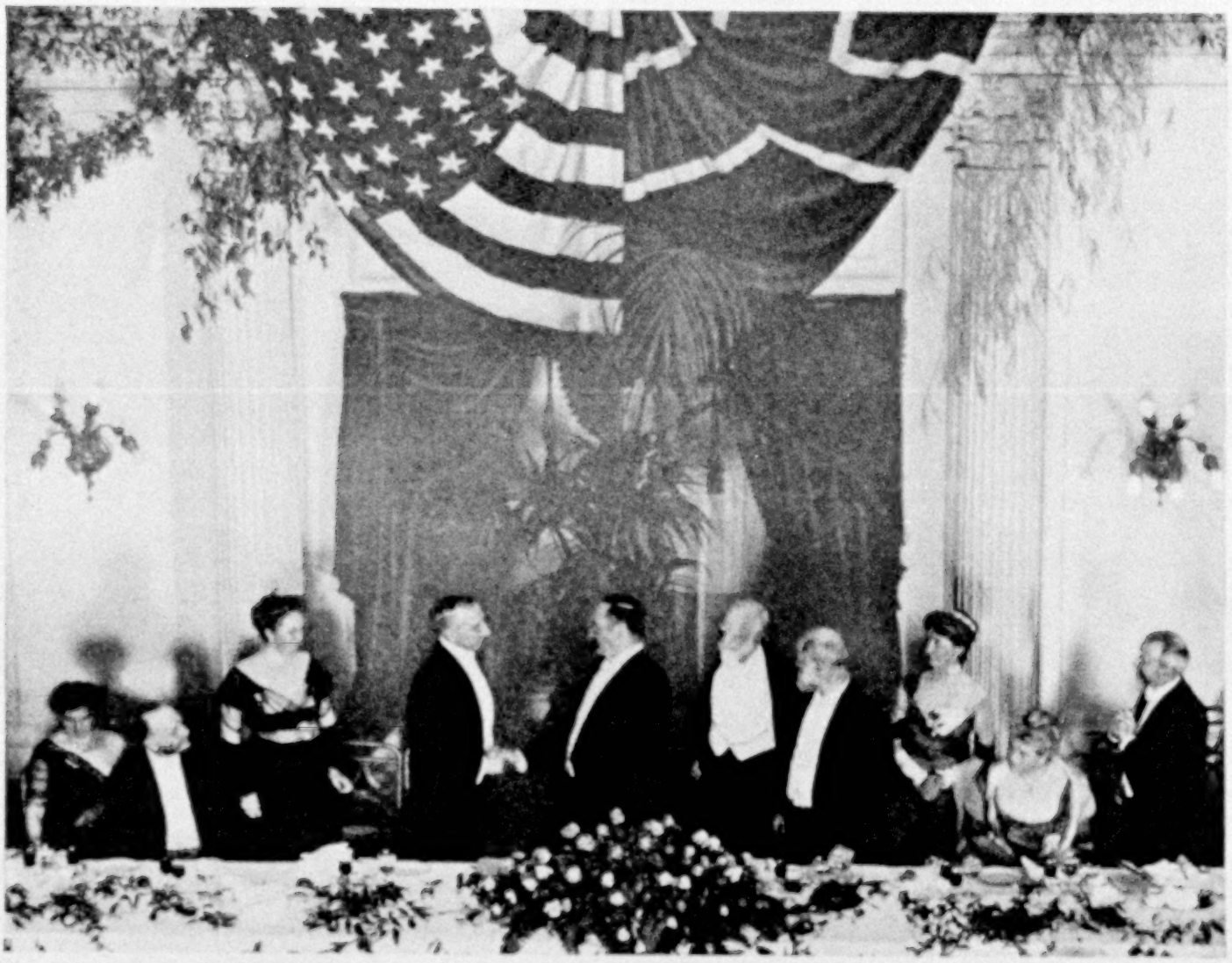
The assiduous nursing of Mrs. Peary, aided by the bracing air, so speedily restored his strength that at the ensuing Christmas festivities which were arranged for the Eskimos he outraced on snowshoes all the natives and his own men!

HE ASCENDS THE GREENLAND ICE-CAP

In the following May, with one companion, Astrup, he ascended to the summit of the great ice-cap which covers the interior of Greenland, 5,000 to 8,000 feet in elevation, and pushed northward for 500 miles over a region where the foot of man had never trod before, in temperatures ranging from 10 degrees to 50 degrees below zero. Imagine his surprise on descending from the table-land to enter a little valley radiant with gorgeous flowers and alive with murmuring bees, where musk-oxen were lazily browsing.

This sledding journey, which he dupli-

* In 1882 Lockwood and Brainard, of Greely's expedition, won the record of Farthest North for the United States, and we held it until Nansen's feat of 1896.



© Harris and Ewing

THE DISCOVERER OF THE NORTH POLE GREETING THE DISCOVERER OF THE SOUTH POLE AT A NATIONAL GEOGRAPHIC SOCIETY BANQUET

It was upon this occasion that Rear-Admiral Peary, on behalf of The Society, presented to Captain Roald Amundsen a special gold medal for his Antarctic achievement resulting in the attainment of the South Pole. Mrs. Peary at extreme left, Ambassador James Bryce at right of Peary, and Ambassador Jusserand at extreme right.

cated by another equally remarkable, crossing of the ice-cap, three years later, defined the northern extension of Greenland and conclusively proved that it is an island instead of a continent extending to the Pole. In boldness of conception and brilliancy of results, these two crossings of Greenland are unsurpassed in Arctic history. The magnitude of Peary's feat is better appreciated when it is recalled that Nansen's historic crossing of the island was below the Arctic Circle, 1,000 miles south of Peary's latitude, where Greenland is some 250 miles wide.

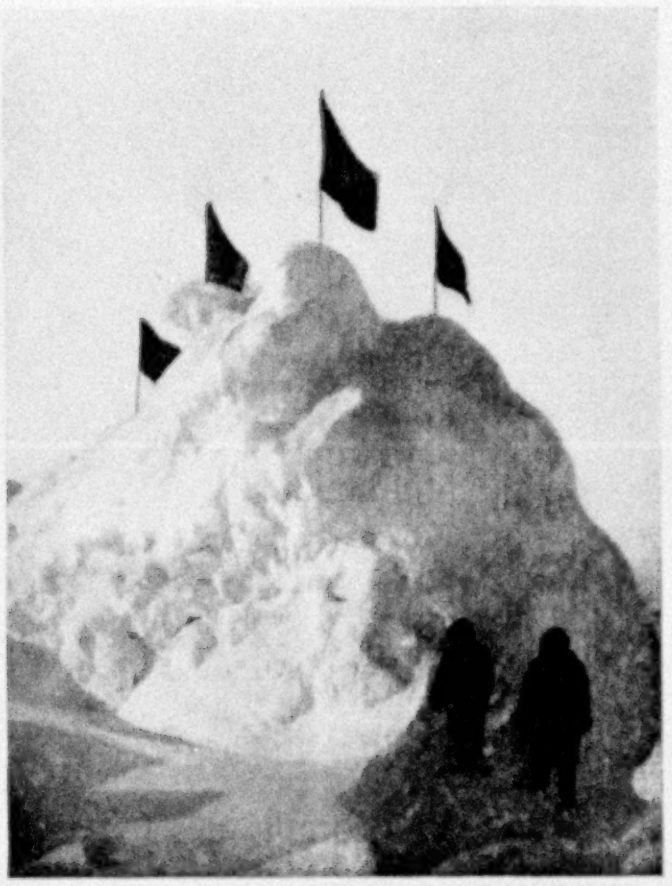
HE TURNS HIS ATTENTION TO THE POLE

Peary now turned his attention to the Pole, which lay 396 geographical miles farther north than any man had penetrated on the Western Hemisphere. To get there by the American route he must break a virgin trail every mile north from Greely's 83° 24′. No one had pioneered so great a distance northward. Markham and others had attained enduring fame by advancing the flag considerably less than 100 miles, Parry had pioneered 150 miles, and Nansen 128 from his ship.

His experiences in Greenland had convinced Peary, if possible more firmly than before, that the only way of surmounting this last and most formidable barrier was to adopt the manner of life, the food, the snow houses, and the clothing of the Eskimos, who by centuries of experience had learned the most effective method of combating the rigors of Arctic weather; to utilize the game of the Northland, the

Arctic reindeer, musk-ox, etc., which his explorations had proved comparatively abundant, thus with fresh meat keeping his men fit and good-tempered through the depressing winter night; and, lastly, to train the Eskimo to become his sledging crew.

In his first North Polar expedition, which lasted for four years, 1898-1902, Peary failed to get nearer than 343 miles to the Pole. Each successive year dense packs of ice blocked the passage to the Polar Ocean, compelling him to make his base approximately 700 miles from the Pole, or 200 miles south of the headquarters of Nares, too great a distance from the goal to be overcome in one short season. During this trying period, by sledging feats which in distance and physical obstacles overcome exceeded the extraordinary records made in Greenland, he explored and mapped thousands of miles of coast line of Greenland and of the islands west and north of Greenland.



ADMIRAL PEARY'S PHOTOGRAPH OF THE NORTH POLE

The northern axis of the globe is in the midst of a vast Polar Sea, and the mound of the photograph is a mere mass of snow and ice utilized by Peary as a pinnacle for the American flag which floats at the top. On his return journey, five miles from the Pole, the explorer came upon a narrow crack in the ice, through which he attempted a sounding. The length of his apparatus was 9,000 feet, but the lead did not strike bottom. So, the depth of the sea at the Pole is still undetermined.

PEARY LED HUNDREDS INTO THE ARCTIC WITH ONLY TWO TRAGIC ACCIDENTS

On the next attempt Peary insured reaching the Polar Ocean by designing and constructing the *Roosevelt*, whose resistless frame crushed its way to the desired haven on the shores of the Polar sea. From here he made that wonderful march of 1906 to 87° 6′, a new world's record. Winds of unusual fury, by opening big leads, robbed him of the Pole and nearly of his life.

The last Peary expedition, 1908-1909, resulted in the discovery of the Pole and of the deep ocean surrounding it. The 396 miles from Greely's farthest had been vanquished as follows: 1900, 30 miles; 1902, 23 miles; 1906, 169 miles; 1909, 174 miles.

No better proof of the minute care with which every campaign was prearranged can be given than the fact that, though Peary has taken hundreds of men north with him on his various expeditions, he has brought them all back, and in good health, with the exception of two, who lost their lives in accidents for which the leader was in no wise responsible. What a contrast this record is to the long list of fatalities from disease, frost, shipwreck, and starvation which in the popular mind has made the word arctic synonymous with tragedy and death.

THE PRIZE OF FOUR CENTURIES IS HIS REWARD

Thus Robert E. Peary crowned a life devoted to the exploration of the icy North and to the advancement of science by the hard-won discovery of the North Pole. The prize of four centuries of striving yielded at last to the most persistent and scientific attack ever waged against it. Peary's success was made possible by long experience, which gave him a thorough knowledge of the difficulties to be overcome, and by an unusual combination of mental and phy-

sical power—a resourcefulness which enabled him to find a way to surmount all obstacles, a tenacity and courage which knew no defeat, and a physical endowment such as Nature gives to few men.

It has been well said that the glory of Peary's achievement belongs to the world and is shared by all mankind. But we, his fellow-countrymen, who have known how he struggled those many years against discouragement and scoffing and how he persevered under financial burdens that would have crushed less stalwart shoulders, especially rejoice that he "made good at last," and that an American has become the peer of Hudson, Magellan, and Columbus.*

PEARY'S ASSOCIATION WITH THE NATIONAL GEOGRAPHIC SOCIETY

Peary's first address to the National Geographic Society was in the fall of 1888, when The Society was only a few months old. He then described an expedition which he had led across Nicaragua. He was actively associated with its work ever since those early days, and on his return from each of his expeditions to the Far North, his first public address was to the National Geographic Society. His last public appearance was on the platform of the National Geographic Society when in January, 1919, he introduced Stefansson, who had just returned from the Canadian North.

It was at a National Geographic Society meeting in 1907 that he was presented the Hubbard Gold Medal of The Society by President Roosevelt, and in 1909 a Special Gold Medal for his discovery of the North Pole, and later he became a member of its Board of Managers.

It was my privilege to know Admiral Peary intimately for twenty years, and I find it difficult to express my admiration and affection for his personal qualities, the bigness of his heart and personality, his loyal devotion to his friends, his generous enthusiasm at real accomplishment by others in any field, his rugged integrity, and his love for everything American.

As long as the National Geographic Society lives, its members can take pride in the fact that the organization did its utmost to help Peary "nail the Stars and Stripes to the Pole."

THE CROW, BIRD CITIZEN OF EVERY LAND

A Feathered Rogue Who Has Many Fascinating Traits and Many Admirable Qualities Despite His Marauding Propensities

By E. R. Kalmbach

Assistant Biologist, U. S. Biological Survey

OUR American crows, with all their thousands, comprise but a small contingent of the corvine hordes that are to be found in one form or another in almost every inhabitable land. Crows are present throughout a large part of the North American Continent, the tundras of Siberia, in the thickly settled valleys of central Europe, along the shores of the Mediterranean, in Africa, India, China, Japan, throughout many of the islands of the Eastern archipelagoes, as well as on that biologically unique continent of Australia.

South America alone seems to be devoid of representatives of that group of birds classified as crows and ravens.

It is true this host is composed of a great number of different species, mainly black fellows, and frequently with reputations appropriately associated with such a garb; but, with all its species, this group of birds is a wonderfully distinct one.

These royal rogues, like clannish races

* The preceding paragraphs are extracted from a brief history of North Polar explorations written by Gilbert Grosvenor for the Foreword of Admiral Peary's book, "The North Pole" (F. A. Stokes Company).

or certain religious sects, have to a remarkable degree preserved their odd mannerisms through many ages. Their bold sagacity and, above all, their ability to eke out a living in environments that Nature seems to have neglected have stood them in good stead in their struggle for existence. Be it a raven, or jackdaw, chough, rook, or crow, its corvine attributes are at once recognizable.

Each of the species has peculiarities all its own, but the characteristics that are common to all, the family marks of recognition, are the ones that readily appeal to any one, and have resulted in the crows and ravens holding a distinctive place in bird lore.

A SUBJECT FOR POETS, FABULISTS, AND MEN OF SCIENCE

Probably more has been written of crows and ravens than any other group of birds. From ancient myth and fable to the poetry and prose of modern times, literature is replete with allusions to them.

In this article the author will endeavor to present, in a way understandable to all, some of the principal findings of his investigation of the food habits of our crows, the full results of which were published as Department Bulletin 621 of the U. S. Department of Agriculture—"The Crow and its Relation to Man."

The preparation of this bulletin entailed the examination of the stomachs of more than 2,100 crows from all parts of the bird's range, supplemented by field observations of many able ornithologists and practical farmers. A period of about five years, with some interruptions, was consumed in stomach examinations alone, using the best of laboratory equipment, including extensive collections of insects, crustaceans, mollusks, vertebrates, seeds, and other possible food items for comparison, and with the collaboration of specialists in the different groups.

Future days may bring about changes in the relative abundance of crows, in the character of crops raised, or even in the feeding habits of the birds themselves, but while present conditions prevail the results of this investigation must be looked upon as authentic (see page 331).

To most people a crow is a crow, and few realize that within the borders of the United States there are no less than nine different forms of corvine birds. Three of these are ravens and six are crows.

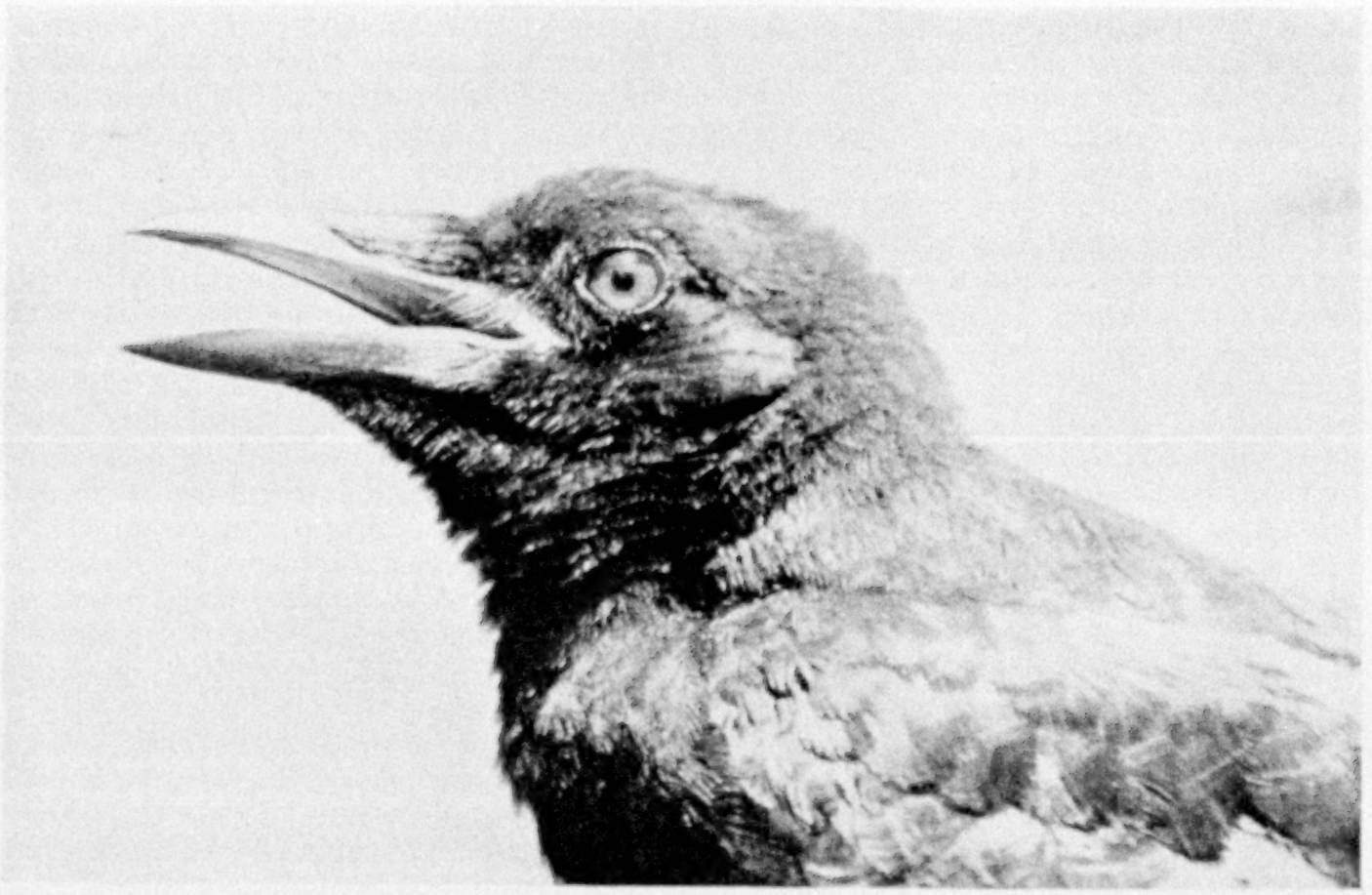
At least four of the six recognized forms of crows present in the United States are simply geographical races of the one species, the common crow, differing chiefly in the dimensions of the wing, tail, and bill, and in any treatment of the subject outside of the naturalist's cloister may well be considered as one. In food habits, and hence in economic significance, the members of these four races are as much alike as the varying food in their respective ranges permits. Another form, inhabiting the coastal region from Puget Sound to Alaska, is by some authorities also considered a geographic race, but in food habits this bird, the northwest crow, is quite distinctive.

The combined breeding ranges of these five races give a distribution to the common crow that extends to the North nearly to the Arctic Circle, throughout northern Manitoba, Ontario, central Quebec, and eastward into Newfoundland. It is found all along our Atlantic seaboard, well down into the peninsula of Florida, and throughout the Mississippi Valley, south to the Gulf coast. In the West crows are found locally in California and abundantly in Washington and Oregon—in diminishing numbers north to Alaska. Throughout the Rocky Mountain area and the arid regions of the Southwest they are not common.

In addition to the widely distributed common crow, there is one other form, quite distinct from it in food habits and economic influence, the fish-crow of the South Atlantic and Gulf coasts. While something is known of the food preferences of this odd maritime species, a full appreciation of its economic influence is dependent on more extensive laboratory and field work.

CROWS ARE MODEL PARENTS

The home life of crows is very orderly and need hardly be mentioned. As parents, they are models in the avian world. The nest, which is well concealed from below during the breeding season, is placed at heights varying from 20 to 60 feet. Here are laid from three to seven eggs, which in our Southern States may



Photograph by William L. Finley and H. T. Bohlman

THE CROW IS EQUALLY AT HOME THROUGHOUT THE CONTINENT OF NORTH AMERICA, IN THE TUNDRAS OF SIBERIA, ALONG THE SHORES OF THE MEDITERRANEAN, IN AFRICA, INDIA, CHINA, JAPAN, AND ON MANY OF THE ISLANDS OF THE EASTERN ARCHIPELAGOES. SOUTH AMERICA ALONE KNOWS HIM NOT.

be found as early as the end of February. Young crows may be found from the middle of March, in the South, to as late as July along our northern border.

The voracious young remain in the nest for about three weeks, and even after they learn to fly are fed to some extent by their parents. Throughout July and August crows may be found in family parties or in small flocks, living comfortably on a commendable diet into which enters a variety of insects, though the annual crop of grain furnishes a portion of the subsistence.

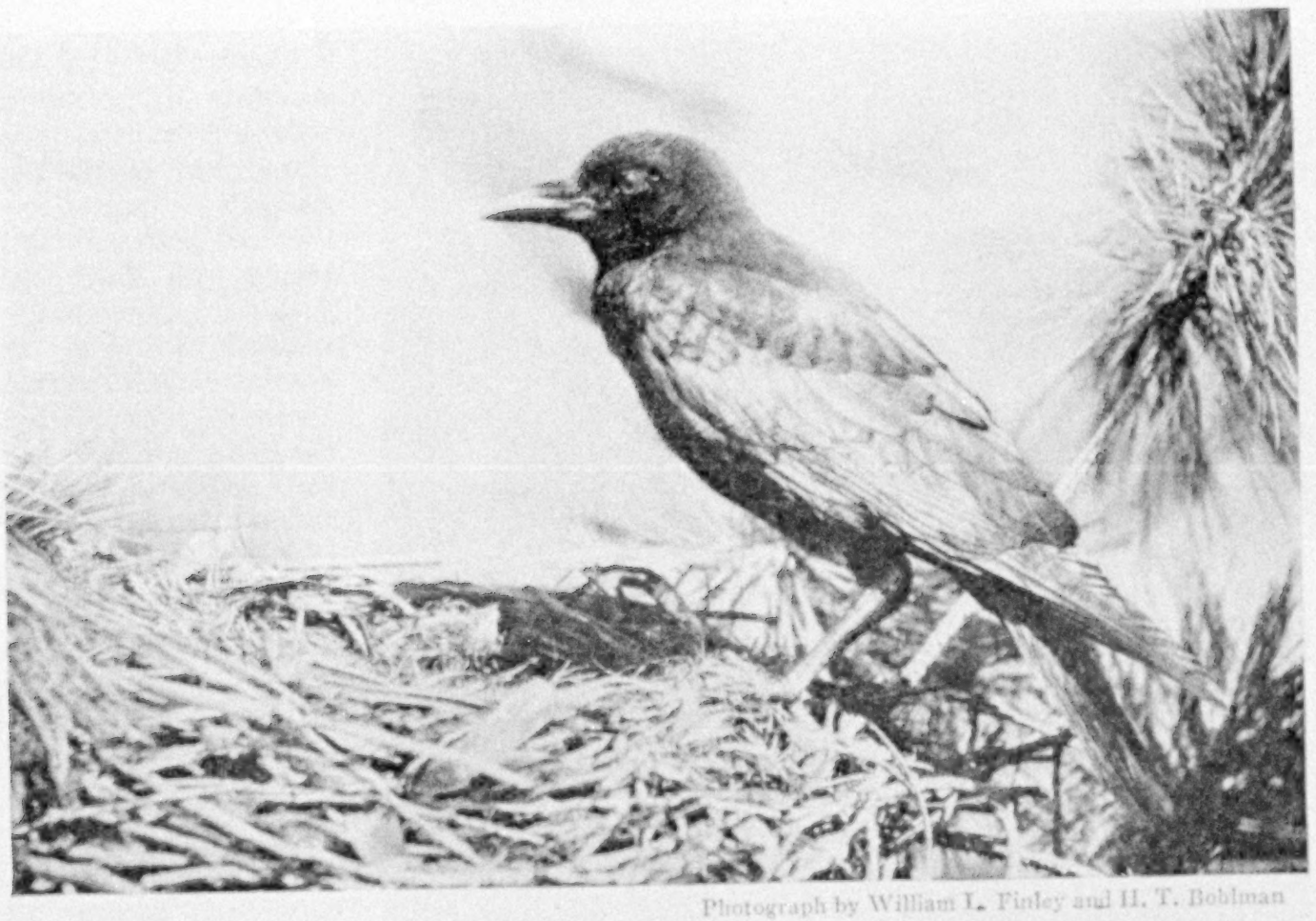
MIGRATION BEGINS IN SEPTEMBER

By September, however, begins the fall migration, and associated with it the establishing of crow roosts, by all odds the most interesting phenomena connected with these birds.

From September to March of each year the migratory habits of these birds bring together in two comparatively small areas the bulk of the crow population of North America. One of these nuclei is located east of the Alleghanies, with its center in the lower Delaware Valley; the other centers about the junction of the Ohio and Mississippi rivers. The western concentration, however, covers a much larger area, and roosts of enormous size may be found as far south as Oklahoma.

In the Far West there is also a condensation of the crow population in the winter months, particularly along the Columbia River and near the coast, but the number of birds involved is in no way comparable to the mammoth gatherings farther east.

While these clannish birds may be noted gathering in colonies of as many as several hundred in northern localities in August and September, it is not until about the first of October that the large conclaves in the latitude of Washington, D. C., begin to take on the aspect of their winter popularity. There is considerable fluctuation in numbers from day to day, and in periods of mild weather a roost previously established may wholly disappear.



Photograph by William L. Finley and H. T. Bohlman

A MOTHER CROW AT THE NEST EDGE

The nestling crow is one of the most voracious members of the animal kingdom. Most of its "growing pains" are in its stomach, and one baby bird consumes from eight to ten ounces of food every day (see chart, page 335).

In late January these nightly congregations reach their greatest size, and by the first of March the birds are well on the northward journey to their breeding grounds.

REMARKABLE CROW CITIES IN WINTER

Words fail to describe adequately to one who has never witnessed it the nightly gathering at a large winter roost of crows. I consider such congregations the most remarkable ornithological phenomena that in this day and age can still be witnessed in the thickly settled sections of our country (see page 328).

And, strange to relate, an extremely small part of the populace realizes the significance of those seemingly endless streams of black forms passing twice daily to and from the roosts, sometimes directly over thickly settled metropolitan sections. Fewer still have any conception of the countless thousands that gather at the hub of the converging streams. Mention of the numbers estimated at several of the better-known roosts may give some impression of the immensity of these conclaves.

One of the most notable roosts was that formerly located at Arlington, Va., where at the height of its occupancy from 150,000 to 200,000 crows gathered nightly.

The so-called "Arbutus" roost, near Baltimore, Md., contained in 1888 about 200,000 birds. At about the same time one or more roosts in the vicinity of St. Louis, Mo., harbored from 70,000 to 90,000 crows, and the one at Peru, Nebr., had from 100,000 to 200,000. Other roosts in which it was estimated the individuals aggregated more than 100,000 were formerly located at Hainesport, Merchantville, Bridgeboro, and Centerton, N. J., and on Reedy Island, in the Delaware River.

Some of these roosts, or their successors near by, still shelter many thousands of birds, although I am inclined to believe that in the East the crow roosts are becoming smaller. But the total num-

Photograph by William L. Finley and H. T. Bohlman

THE DINNER CALL

Grasshoppers, mice, May beetles, mollusks, frogs, caterpillars, and a score of other crow dainties are required to sate the appetite of this inordinate young feaster.

ber of these birds appears to be about the same. In the winter of 1910-1911 a roost near Woodridge, D. C., which appears to have been the successor to the Arlington roost, was estimated to contain 270,000, while in 1914 only about 30,000 birds could be accounted for.

There is evidence that leads one to think that in parts of Oklahoma some of the roosts have increased materially within recent years—a situation that may have been brought about by the increasing acreage of sorghum in that section, as this grain serves as an admirable winter food for these birds. Absolutely no credence, however, need be given to reports, which at times have had wide circulation, of roosts totaling "millions of birds."

Crow roosts are usually located in sparsely settled sections, but with the constant encroachment of man on virgin tracts the bird has found it increasingly difficult to find its former seclusion. Even in face of this, the crow maintains its interesting roosting habit, with the result that now we may witness this phenomenon in places readily accessible.

FAMOUS CROW COLONIES NEAR WASHINGTON

In the winter of 1912-1913 several thousand crows established a roost northwest of Washington within a few hundred feet of the Connecticut Avenue Boulevard, where trolley cars and automobiles passed every few minutes throughout the night.

The former location of the Woodridge roost, northeast of the National Capital, was in a small strip of Virginia pines near the station of Rives, on the Baltimore and Ohio Railroad. The passing trains caused no end of uproar while the clans were assembling, but when darkness came they paid little attention to the noise.

The present location of the Woodridge roost, while in a more secluded place than formerly, is still readily accessible and forms an important attraction to the bird-lovers of Washington. Just south of the Bladensburg road and at a point about one-third of a mile northeast of the Pennsylvania Railroad bridge lies a tract of woodland that extends in a long narrow strip to the south.

At the southern end there is still much

of the virgin stand left, but throughout most of this stretch a more or less mutilated second growth furnishes the nightly abode for many thousands of crows. Here, thanks to regulations prohibiting hunting in this part of the District of Columbia, the birds have found a fair measure of safety, though at times adventurous boys or thoughtless adults cannot resist the temptation to shoot up the roost.

Time will come when the clearing of this land will drive the birds away, but until then let us hope the Woodridge crows may continue unmolested their wonderful winter performance.

BIRD ASSASSINS RAID THE ROOSTS

At the roosts, where some conclude crows gather for mutual protection from enemies, the mortality is often high. Here the great horned owl wreaks cruel vengeance for the mobbing it receives at their hands in daylight hours, and the gaunt specter of disease at times stalks through their ranks.

A malady that has been erroneously termed roup leaves in its wake a certain toll every winter, and, when it appears in virulent form, the occupants of large roosts may be practically exterminated. This disease, affecting the mucous membranes of the throat and nostrils, also causes a whitish, translucent film to form over the eyes. Blindness follows, and I have seen hapless victims groping along the branch upon which they stood, apparently in a vain search for food.

Under the rigors of the disease, with gradual starvation sapping their strength, and with the relentless elements making suffering more intense, these unfortunates may succumb by the thousands in the course of a few weeks (see p. 330).

HOW THE MIGHTY FLOCK ASSEMBLES

The assemblage of one of these mighty concourses is a sight that will move even the least impressionable, and it never loses its grandeur by repetition. Scores of times have I watched the gathering hosts at the Woodridge roost; but the sight is no less appealing today than it was on the occasion when I first observed it. Essentially the procedure is the same from day to day, but, like a crackling fire or the battle of the surf, never becomes monotonous.

Photograph from H. M. Stowe

"A CROWS' ROOST"

As a pet the crow provides endless entertainment and not a little worry, for the bird is mischievous, ubiquitous, and resourceful.

Like a human rabble, these mighty flocks always seem to have their moods. There are clear days, with the birds flying high, when all appear festive bound; there are short days with leaden skies, when sullenness pervades; and there are tragic days—days with deep snow and high winds, when the spirit of grim determination alone brings back to the roost those that the elements have spared.

The battle for existence in the short days of January and February is indeed a cruel one for the crow; and when I see it in endless thousands engaged in a life-and-death struggle against the elements, starvation, disease, and even man himself, and it persists in fighting the battle on the same lines as its ancestors

Official photograph U. S. Biological Survey

ROOSTING CROWS (SEE PAGE 325)

Few sights in the bird world equal in impressiveness the assemblage of a large crow roost. This photograph was taken after sundown, with an exposure of several minutes, at the Woodridge roost, near Washington, D. C. The air was filled with flying birds, but only those that remained stationary for the greater part of the exposure made a conspicuous photographic impression.

fought centuries before, that black specter ceases to be a mere bird. It becomes the embodiment of a courageous spirit, living true to a cherished tradition. It is then that I admire the bird.

THE PERSONALITY OF THE CROW

The old adage, that familarity breeds contempt, has no place in a consideration of the relation between the crow and man. Undue familiarity with crops, wild birds, and poultry on the part of the crow has resulted in opinions regarding it that are far from complimentary; but I have never heard any one, even a confirmed enemy of the bird, refer to it in words of utter contempt. More intimate acquaintance may increase antagonism, but with it grows apace a greater appreciation of the crow's resourcefulness.

Notwithstanding that in the wild state it constantly avoids close association with man, the crow, when captured as a nestling, readily lends itself to domestication and, as a pet, reveals many fascinating traits.

I know of no bird that will furnish such an endless variety of entertainment, and, I may add, as much trouble, as a pet crow. They may be taught to utter a few words of articulate speech, but this is frequently interspersed with a choice assortment of ordinary corvine jargon that at times borders on the ridiculous. To perfect a crow in this respect, continuous association with the bird and infinite patience are necessary. The splitting of the tongue, so frequently recommended, adds nothing to the crow's ability as a linguist.

The intensity of corvine curiosity is almost feminine, and, if given a few trinkets, a pet crow will find no end of amusement.

Above all, crows are notorious thieves and hoarders, and if permitted the freedom of the dooryard will establish numerous caches of treasure.

I distinctly recall a friend's pet crow that, by its confiding nature, had earned an affectionate place in the household. The bird was always interested in garden operations, and when work was being done in the flower beds was sure to be present. One summer morning found its mistress busily engaged in weeding an aster bed. The refuse had been carefully raked into neat piles between the rows when a telephone call took her away for a moment, and in the brief absence the crow, that no doubt had been paying some attention to the operations, completed the job by pulling up the asters and depositing them in equally neat piles beside the refuse.

Another crow, whose plant-pulling proclivities had been developed almost to the point of an obsession with respect to a certain potted geranium, is the subject of a story once told by Mr. Robert Ridgway, the eminent ornithologist. This crow persisted in removing a particular plant, despite all that Mrs. Ridgway could do to keep it growing.

On one occasion the bird was observed busily engaged in grubbing for insects in the garden. It suddenly ceased its diligent search, paused for a moment with its head alert, then proceeded, half hopping, half flying, through the garden, the gate, and up the back stairs, directly to the doomed geranium, which was straightway pulled up and deposited neatly beside the pot. This done, the bird returned to its place in the garden and continued its methodical search for grubs.

Official photograph U. S. Biological Survey

THE GAUNT SPECTER OF DISEASE AT TIMES STALKS THROUGH THE RANKS OF CROW ASSEMBLAGES

This disease, affecting the mucous membranes of the throat and nostrils, also causes a whitish, translucent film to form over the eyes. Blindness follows; then these hapless creatures may be seen groping along the branches of trees, apparently in a vain search for food (see page 330).

DOG AND CROW, BOON PLAYMATES

Dr. Ned Dearborn has related an interesting story of a crow and a farmer's dog that grew up together. The dog enjoyed chasing sticks and stones, and it remained for the observant crow to evolve a plan for mutual amusement. The fracas would usually start whenever the crow found the dog enjoying a noon-

Photograph by Prof. E. H. Eaton

THE DEATH TOLL OF A SINGLE NIGHT AT A CROW'S ROOST

In December, 1901, the crows of Ontario County, New York, suffered severely from a malady erroneously termed roup. In the illustration are the bodies of 73 dead crows, photographed where they fell, in an area about 150 feet in diameter (see page 327).

day snooze. Finding a stick of convenient size, the bird would approach the dog, lay it down within easy reach, and then give its canine friend a nip or two on the heels.

As the startled dog awoke, the crow would grasp the stick in its bill and, flying about four feet from the ground, would start across the fields with the dog in hot pursuit. This continued until both had reached the point of exhaustion; whereupon each would return to its respective place of rest, the dog on the door-step and the bird on a nearby shed.

Mr. Nelson Wood, of the U. S. National Museum, who has had extensive experience with domesticated crows, several of which developed the power of speech to a remarkable degree, tells many interesting anecdotes of these birds. One, whose cage extended over the top of an inclined cellar door, once discovered that the cover of a baking-powder can with which it had been playing would readily slide down this incline. After experimenting with this toy for some time in various ways, it accidentally stepped into it while at the top of the incline. That was enough. Thereafter this avian "shoot-the-chute" furnished no end of amusement for both bird and spectators.

A CROW'S REVENGE

Another pet, whose linguistic powers were above the average, would increase its range of tone by thrusting its head into a tin can and there give vent to its thoughts. The activities of this same bird form the basis of an incident which I hesitate to construe as a manifestation of corvine strategy and desire for revenge, but an imaginative mind might so interpret the circumstances. It nevertheless makes a good story.

"Jack" had been severely reprimanded and, I believe, punished for alleged offenses in a neighbor's cabbage patch. These cabbages were choice plants—a fact that even "Jack" seemed to appreciate after he had been taken to task, as

thereafter an overhanging tree was his nearest approach to the patch.

For a week or more the cabbages prospered wonderfully, but one day, as the neighbor was busily engaged in his cellar, he heard coming from the patch a "swish, swish" that strongly suggested the tearing of cabbage leaves. On rushing to the door he beheld "Jack," flying a few feet from the ground and with leisurely wing beats traveling up and down the rows. Behind him, in mad pursuit and with utter disregard for his master's prize cabbages, was the neighbor's own dog.

Another exasperating trick, but one that seems to reveal the crow's love of pure devilment, is related by Mr. Wood, and I believe the account of a similar incident has appeared in literature. In these cases the crows amused themselves by pulling all the clothes-pins off the line just after the week's washing had been put out.

THOUSANDS OF BIRDS' STOMACHS MUST BE STUDIED

Two underlying factors make the crow, economically speaking, one of our most important birds. It is abundant and it is large. Birds, on the whole, require a volume of food in direct ratio to the size of their bodies, and no one has yet advanced the theory that crows are modest or restrained when dining. It follows, then, that what facts are determined regarding the character of the crow's food habits must be given more than ordinary consideration. Even a minor food habit of a bird so voracious and numerous as the one under discussion may have most important influences for good or harm.

How, then, it is asked, can one know to the point of exactness the food preferences of the crow? This is a most logical question. Ornithological literature is burdened with generalities regarding the food of birds—yes, and, I may add, inaccuracies—copied verbatim from some earlier writer, who in turn has simply served to pass the word along, so that today one can find many of Audubon's statements still doing overtime duty.

No element of disparagement of Audubon's work, which when published was the most exact of its kind, is implied by this statement; but modern necessity demands, and is rapidly securing, results far more accurate than the data secured by the field ornithologists of the early days.

The method employed involves extensive and intensive examination of the stomach contents of the birds under investigation. In this work the United States, through the agency of the U. S. Biological Survey, now leads the world.

No one, however, has ever looked upon economic ornithology, even in its most modern form, as one of the exact sciences. In dealing with birds we are dealing with living creatures — vivacious, whimsical, often erratic creatures—that sometimes seem never to do the same thing twice. But experience has shown that the benevolent law of averages, when applied even to a series of examined bird stomachs, produces results that are so close an approximation to the truth that the addition of large quantities of material fails to affect appreciably the result. Thus the greater the material, the more accurate the result.

In the case of the crow 2,118 stomachs, collected in 39 of our States, the District of Columbia, and some of the Canadian provinces, were available, and of these 778 were of nestling birds. This is the third largest quantity of stomach material ever used in the study of the food habits of a single species of bird.

THE CROW ENJOYS A VARIED MENU

The crow is primarily a terrestrial feeder and a most resourceful one. More than 625 specifically different items are at present known to furnish it sustenance. Herein lies the reason that it can survive the rigors of winter, and, when the halcyon days of early summer arrive, it knows also how to live and rear its young in true avian opulence. And the young, let me assure you, never languish for want of proper food, either in kind or quantity.

About 28 per cent of the animal food of the adult crow is secured from the animal kingdom and from fully a dozen different groups in that kingdom. In addition to such lowly organized creatures as earthworms, it secures nourishment also from crustaceans, all the common orders of insects, spiders, snails, and

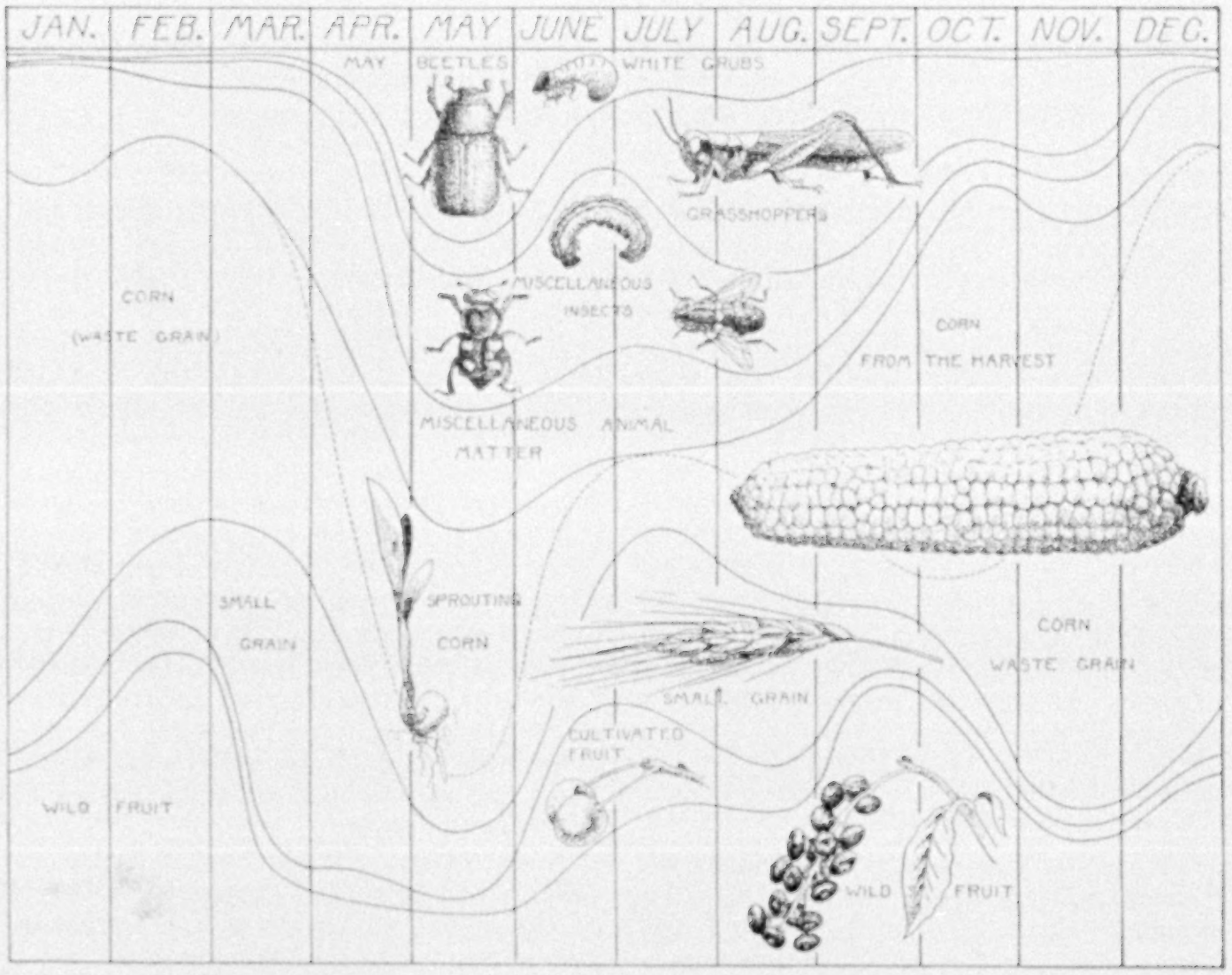


Chart from E. R. Kalmbach

A GRAPHIC PICTURE OF THE CROW'S FOOD, MONTH BY MONTH

The relative proportions of the principal food items are shown throughout the yearly cycle. The varying width of the bands representing the several items corresponds to the quantity of each food taken in successive months. The crow, like most birds, eats that which is most abundant and hence easiest to get. May beetles are taken mainly in May and June, grasshoppers from July to November, and other insect life is present throughout the warmer months. Corn constitutes the largest part of the crow's annual sustenance, but most of this is waste grain. The broken line dividing the corn sector separates that which is secured from the sprouting crop, in April, May, and June, and the ripening crop, in September, October, and November, from corn which is evidently waste.

numerous vertebrates, including fish, amphibians, reptiles, birds, and mammals.

It is in the consumption of certain of its animal food items that the crow renders man its greatest service, and in feeding on others has brought upon its head condemnation without end.

In its choice of insect food, which forms a little less than a fifth of the yearly sustenance, the crow leaves little to be desired. In this portion of the diet are found some of the worst pests with which the farmer has to contend—wireworms, cutworms, white grubs, and grasshoppers.

From the beginning of May until well into September, over a third of the crow's food is derived from insects alone, and were these creatures available the year around, the crow would be found doing yeoman duty throughout the seasons.

AN ENVIOUS RECORD IN THE DESTRUCTION OF INSECTS

As an effective enemy of May beetles, the parents of the destructive white grub, and of grasshoppers, no bird in the eastern United States is the equal of the crow in the point of numbers consumed. In May the beetles mentioned above constitute more than a fifth of the food of adult crows, while in August and September grasshoppers constitute nearly an equal

portion. Nestling crows also are fed large quantities of each of these insects.

A better idea of the avidity with which crows seek and devour such insect prey can be gained from the following presentation:

Of 197 adult crows collected in the month of May in many different States, 156 had fed to some extent on May beetles, and in several of the stomachs these pests formed more than 90 per cent of the contents.

A brood of three partly grown nestlings secured in Wisconsin had been fed on nothing else. Another brood of five from the District of Columbia had subsisted to the extent of nearly three-fourths of their food on these insects, an aggregate of about 70 individuals being consumed.

It remained, however, for 12 nestlings (three broods) raised in Kansas to carry off the honors as destroyers of May beetles. These 12 birds had at their last meal cared for 301 individuals, one taking as high as 53.

As grasshopper destroyers crows do even better. One wise old bird from southern Indiana had reduced the grasshopper population by 123, but among the young crows the laurel must again be bestowed upon the Kansas delegation. The most noteworthy work of grasshopper destruction by crows of which I have knowledge was performed by a half-grown brood of four secured at Onaga. These birds had consumed 133, 106, 105, and 74 respectively—a total of 418, or an average of about 104 apiece. Another nestling had eaten the surprisingly large number of 143!

It is noteworthy that these birds were all collected in years of normal grasshopper abundance, and what the crows would do during periods of grasshopper outbreak is an interesting subject for conjecture.

Aside from their war on May beetles and grasshoppers, the latter of which alone is charged with inflicting damage to the crops of American farmers totaling $50,000,000 annually, the crow renders invaluable service in other directions. The cotton-worm, the army-worm, the fall army-worm, the tussock moth, the spring canker-worm, the tent caterpillar, the gypsy and brown-tail moths, and the chinch-bug—what a rogues' gallery of the insect world!—all must attribute a part of their struggle for existence to the vigilance of the crow.

HOW MUCH DO CROWS EAT?

Some experiments have been made to determine the quantity of insect and other food required to sustain a crow. Mr. E. A. Samuels has stated that captive birds in his possession ate as much as eight ounces of animal food daily, while Forbush in working on young crows found "that when they were fed less than eight ounces per day they either did not increase in weight or fell off, and it was not until each crow was fed ten or more ounces that their weight increased." Dr. Ned Dearborn informs me that an adult crow in his possession ate an average of 4.83 ounces of animal food in a day.

Consider for a moment, then, the daily grasshopper consumption of a family of six crows, two old and four young, located, we will say, at Onaga, Kans., where in 1913 crows were found subsisting on grasshoppers to the extent of about 42 per cent of their food.

Allowing each of the young ten ounces of food a day and each of the adults five, it would take a daily ration of 50 ounces to supply their wants. Interpreting 42 per cent of this into terms of medium-sized grasshoppers, at the rate of about 87 per ounce, we find that such a corvine household under normal conditions would destroy over 1,827 of these pests every day the young were in the nest, and for the entire nestling period of about three weeks the surprising total of 38,367 hoppers would have been cared for!

AS A PREDACIOUS BIRD

Bird-lovers generally and sportsmen, game-keepers, and poultrymen in particular are vitally concerned with the crow's relation to other wild or domestic birds. There is no question that in part, at least, their apprehension, frequently expressed, is warranted. While the creation of game farms and preserves has served to bring this subject to the fore in recent years, the predatory habits of the crow are by no means recently acquired. The egg-stealing and bird-killing crow was present under primeval conditions,

and today is simply living true to its inherited instincts.

In the heronries along the out-of-the-way watercourses of Louisiana, under conditions wholly unaltered by the hand of man, I have seen these black marauders taking their toll; and again among the herons of the lower Santee, in South Carolina.

The anhingas and egrets of central Florida, the gulls and other waterfowl at Stump Lake, N. Dak., the sharp-tailed grouse of Manitoba, and the ducks of Saskatchewan are in these years fighting the same battles their ancestors fought centuries before. Are they fighting a losing battle, and does all of this mean that in the end the crow, not man, shall decree which of our birds posterity shall enjoy and which are to go?

Stomach examination in this case lends valuable but not complete information. The albumen of an egg or the soft body of a nestling bird soon disappears under the powerful digestive juices, and, even with the most careful work, items of this kind may be overlooked. The laboratory, however, has indicted the egg-stealing and bird-killing crow, but at the same time it conclusively refutes the exaggerated statements of extremists.

THE CROW IS NOT OFTEN A CANNIBAL

Wild birds and their eggs constitute only about one-third of 1 per cent of the annual food of the 1,340 adult crows examined. This resort to cannibalism occurred chiefly in the months of May, June, and July, the period in which the crow has to provide a copious animal diet for its young.

Under normal conditions about 1½ per cent of the food given to nestling crows also is secured at the expense of other birds. About 1 in every 28 adult crows and 1 in every 11 of the nestlings examined had partaken of the forbidden food.

Such incriminating evidence cannot be turned aside lightly. But there are mitigating circumstances that must be taken in consideration. In the first place, most of this destruction takes place during the nesting season of the crow, sufficiently early in the year to permit those species that have lost a first setting of eggs to lay and incubate a second clutch at a time when they will be little molested by the crow.

A goodly portion of the adult birds which the crow secures no doubt are cripples or weaklings, their elimination increasing the virility of the species preyed upon. And then, too, it must be borne in mind that crows habitually pass to each of their nestlings a portion of so dainty a meal as another bird's egg or young, with the result that, when stomachs are examined, a single act of vandalism may be recorded in each of four or five stomachs.

Distinction also should be made between the common crow and the fish-crow, which is notoriously a worse pilferer of nests.

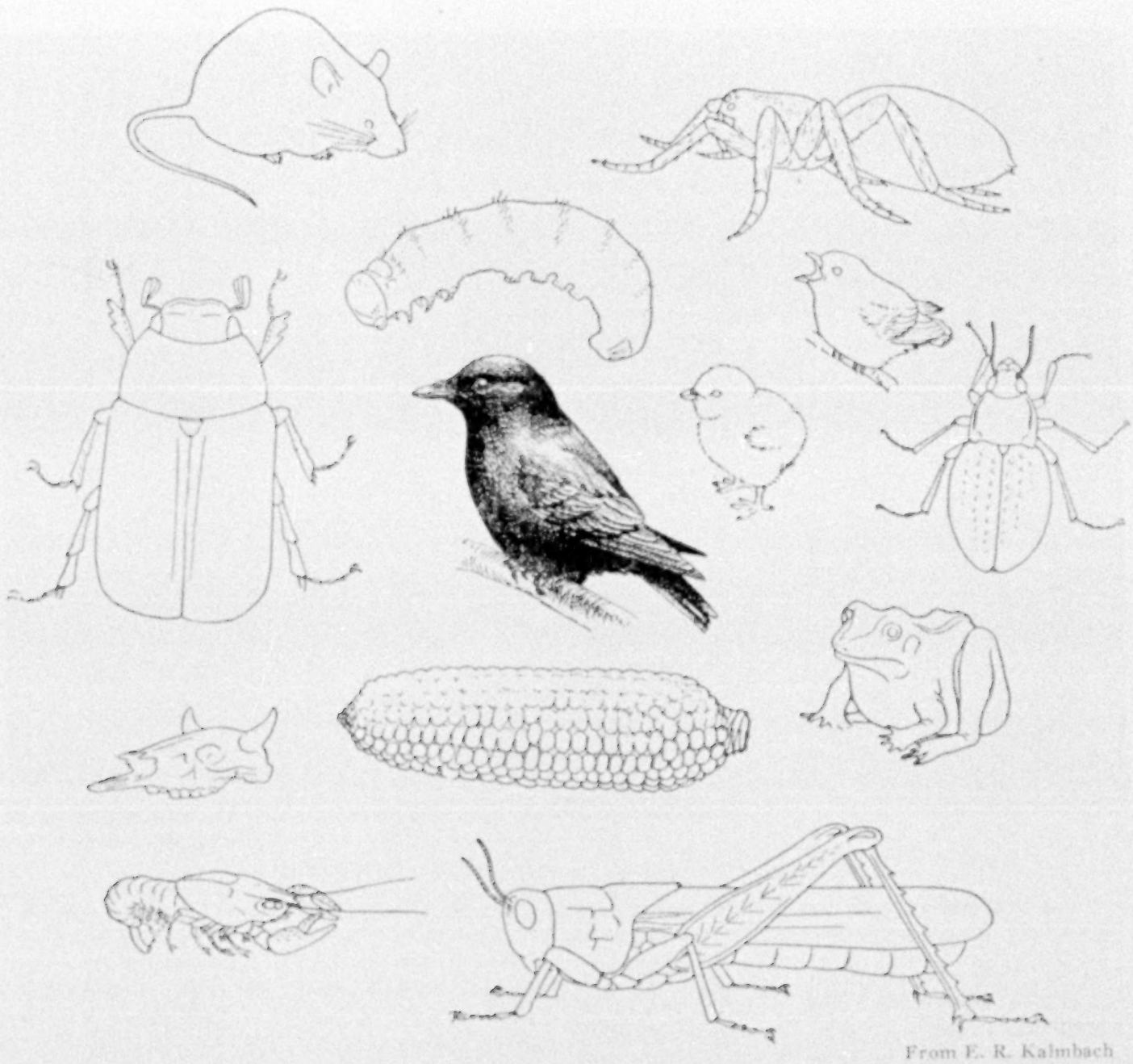
In summing up the evidence that has come to hand, I am forced to the conclusion that in the vicinity of game farms and preserves, where it is the desire to foster certain species in an abundance greater than that decreed by Nature, the crow must be held in check.

Under natural conditions, game and insectivorous birds will hold their own, regardless of the crow, if furnished the necessary cover and not shot too close. Consequently, I doubt the wisdom of extensive crow campaigns, conducted with the sole object of improving game conditions over a large area.

Poultry furnishes about as much food for the crow as does wild-bird life; but most of this loss can be prevented by more careful housing. The shift-for-itself method of poultry-raising will always pay its toll to crows, hawks, and owls.

Chicken-stealing appears to be largely the trait of individual birds, which, by reason of the proximity of their nests or the accessibility of the poultry yard, have been afforded an easy means of getting a plentiful supply of nourishing food. The killing of one or two engaged in the practice will usually put a stop to such raids.

As a ravager of certain other forms of animal life, the crow exerts influences, some good and some bad. In feeding on mollusks and fish, nothing of great economic significance is involved. The frogs, salamanders, and toads it consumes are



From E. R. Kalmbach

WHAT IT TAKES TO RAISE A CROW

The nestling crow requires about 10 ounces of food per day, or about 13⅛ pounds for its nestling life of three weeks. At the end of that time it will weigh about a pound. During this period it will have eaten two and a quarter times its own weight of May beetles. The grasshoppers it has eaten would, if combined, form a mammoth insect about twice the size of the bird. Wild birds and poultry would each form a mass about a fifth of the crow's weight and corn about one and one-half times its mass. Here are pictured a fully fledged young crow and its principal food items. These include small mammals, spiders, caterpillars, May beetles, poultry, wild birds, miscellaneous beetles, carrion, corn, amphibians, crustaceans, and grasshoppers. These are all drawn to a scale that approximately represents the aggregate mass of the different items consumed during the nestling life, compared with the bird that ate them.

mainly insectivorous, and their loss is to be deplored, but in the destruction of mice of various kinds the crow serves the best interests of the farmer.

THE CROW IN THE CORN-FIELD

The crow and the corn crop are inseparable. Corn is the crow's staff of life, though much of what it takes is eaten more from dire necessity than from choice. Corn forms over 38 per cent of the adult crow's food; but by far the largest portion is consumed from the middle of November to the end of March, a time when there is no sprouting grain to be had and when the crop of the year should be securely housed. It appears, then, that waste grain forms the greater portion of the crow's corn diet.

This fact, however, does not absolve the

Photograph by Dr. J. B. Pardoe

BLACK AND WHITE, A STUDY IN CONTRASTS

A dog and a crow would seem to be strange playmates, but a student of bird life tells of two such comrades who were raised on a farm. The chief sport of the crow consisted in laying a stick within easy reach of the dog while the latter slept, then waking him with a nip on the heels. Whereupon, the bird would seize the stick and fly across the field with the dog in hot pursuit. The chase would continue until both play-fellows were exhausted (see text, page 329).

crow from all blame in connection with the damage inflicted on sprouting corn or on the harvest before it has been removed from the fields. It is one case where stomach examination is hardly necessary; but stomach examination has been made and it has convicted the bird. The court of last appeal has returned an adverse verdict, with, however, a recommendation for clemency.

In the Middle West, where fields of corn reach to the horizon and beyond, the crow is an unimportant factor, though it is present in considerable numbers. The birds, no doubt, take their toll, but the crop is so great that their depredations are insignificant.

In smaller fields—for instance, in the hilly sections of northern New Jersey—damage is often severe. But even here one can resort to measures that in the main will frustrate the crow's intentions. That same shrewdness that stands the crow in such good stead in its struggle for existence may be used by man to accomplish his own ends. No bird detects danger and remembers unfortunate adventures more readily than the crow. Even the use of coal-tar, with its gassy smell, applied to seed grain has brought relief from the corn-pulling crow, and the killing of a few birds, either by shooting or by the use of poisoned grain, will usually secure immunity for small fields.

THE CROW LEARNS HIS LESSON IN WASHINGTON STATE

While poison should be used sparingly and judiciously, so as not seriously to endanger other wild life, there is no question of its efficacy against crows.

This fact was never more forcefully

demonstrated than during the past season, when the crows of Klickitat County, Washington, were attempting to repeat their annual feast in the groves of green almonds at Goodnoe Hills. For several years these birds, roosting in thousands in the hilly country bordering the Columbia River, had been growing increasingly bold in their sorties.

The loss to some growers was 100 per cent, for when a flock of 10,000 or more crows settled in a grove of fifteen acres a few hours' feast would strip the trees.

Scare-crows had availed nothing and shooting brought only temporary relief. Even sporadic efforts at poisoning, in which carcasses and grain had been used as bait, failed to serve the purpose. A few crows were killed, with the result that the rest studiously avoided the carcasses and the grain, but kept on eating the nuts.

It was not until some one conceived the idea of feeding the marauders poisoned almonds that relief was gained. Only a few crows were killed by this method, but their comrades had witnessed their fall. Abject despair seemed to seize the mighty host. The flock rose from the grove as a monstrous black cloud, and, with a deafening roar of protesting voices that could be heard for miles, it left Goodnoe Hills. Some almond groves of the Hills were severely damaged, even this year, but in those where a few poisoned almonds had been placed crow damage had been reduced from a possible 100 to about 2 per cent.

A WAR OF CROW EXTERMINATION NOT WARRANTED

Our enormous corn crop has greatly simplified the crow's winter task of making a living, as the other vegetable food items of the crow constitute by no means a highly nutritious assortment.

The hardened fruits of dogwood, sour-gum, greenbrier, smilax, Virginia creeper, sumac, poke-weed, a few acorns, and the wax-covered seeds of bayberry, poison ivy, and poison oak constituted the chief sources of food for the North American crows in pre-Columbian times. Today they still get a portion of their sustenance from these sources, and at their winter roosts may be found heavy deposits of the indigestible portions of these fruits.

When all is said and done, one is forced to the conclusion that legislation which permits the killing of crows whenever they are doing damage is necessary. Such permission is now granted under the laws of all States in which crows are numerous.

On the other hand, bounty laws that result in the killing of crows in places and at times when they may be doing great good are reactionary. Only in rare cases is it conceivable that drastic control measures for the protection of crops are warranted for areas as large as an average State. Misguided efforts that at times gain impetus for nation-wide crow campaigns on the pretext that a near or complete extermination of the bird would benefit the American farmer cannot be justified if all the evidence is fairly presented.

THE HUMAN ATTRIBUTES OF THE ROBIN HOODS OF THE BIRD WORLD

Aside from any economic considerations which are sufficient in themselves, the passing of the crow would leave a distinct void in our attractive bird life. Its crimes are many, but its virtues must not be overlooked (see also page 334).

Who can deny that our Robin Hoods and other adventurous spirits have left us in the story of their lives, though checkered, much that is good and much to be admired? The world would have been poorer without them. To one whose association with the crow has been at all intimate, there comes a bit of the same feeling.

There is much of human character—fear and boldness, affection and hate, ingenuity, perseverence, and revenge—to be found in the life habits of this interesting bird. Let those who would actually exterminate it pause long enough in their efforts to learn more of the crow's real and potential powers in the control of certain pests. Then, and only then, will the general attitude toward the bird become an intelligent one.

THE NATIONAL GEOGRAPHIC SOCIETY'S NOTABLE YEAR

NOTABLE advance in usefulness and growth in membership have marked the history of the National Geographic Society during the past year. Its accomplishments in the increase and diffusion of geographic knowledge are the occasion for cordial congratulation of the more than 750,000 individual members; it is their faith and their support of the organization's aims that have heartened and encouraged those to whom has been entrusted the direction of The Society's activities.

In recognition of The Society's service to geography, and particularly in appreciation of its grant of funds which saved some of the Big Trees of the Sequoia National Park, California, from destruction at the hands of commercial interests, James C. Horgan, of Los Angeles, made a bequest during the year of $8,000, the income from which is to be used for The Society's work.

THE SOCIETY ADDS TO THE WORLD'S KNOWLEDGE OF VOLCANIC ACTION

Foremost among the achievements of The Society during the past few months was the splendid success of the sixth expedition dispatched to the region of Mount Katmai, the world's largest active volcano. There an exhaustive study was made of the now famous "Valley of Ten Thousand Smokes," discovered by an earlier Geographic expedition and recognized today as perhaps the most remarkable natural phenomenon on the face of the globe—an area where chemists, physicists, geologists, and petrographers may actually study the processes by which the earth has evolved through the ages from a seething mass of matter into a habitable planet.

A SPLENDID HARBOR DISCOVERED

The 1919 expedition, which sailed from Seattle eleven months ago and which completed its work late in the autumn, was equipped at a cost of more than $30,000, but the treasure of knowledge which it brought back to The Society's members and which is to be given to the scientific world represents inestimable dividends in the form of facts.

One of the most significant accomplishments of this expedition was the discovery of a magnificent harbor, christened Geographic Harbor in honor of The Society, near the entrance to the valley. This find will result inevitably in the opening of this region to tourist travel, and it requires no prophetic vision to see Mount Katmai and its surrounding wonderland, already a national monument by presidential proclamation, elevated in the near future to the importance of a national park, in which all America may enjoy the marvels of its awesome majesty, the beauty of its fairy flowerland in summer, the charm of its woodlands, and the fascination of its wild life.

The findings of the sixth expedition were recorded by both motion picture and color photography. The films of the former have been shown to the members in the National Capital, and it is hoped that arrangements can be made to exhibit them to Geographic members throughout the United States. The official report of the leader of the expedition, Prof. R. F. Griggs, will, as in the case of all previous expeditions organized by The Society, be told, with a wealth of illustrations, in an early number of the NATIONAL GEOGRAPHIC MAGAZINE.

HUBBARD MEDAL AWARDED TO STEFANSSON

Supplementing its own achievements in the world of exploration, the National Geographic Society saw fit to pay tribute to the services of a distinguished explorer who has added more than 100,000 square miles to the mapped area of the Western Hemisphere. This explorer, Vilhjalmur Stefansson, was awarded the Hubbard Gold Medal of The Society, and upon that occasion the recipient of the honor was introduced to the members present by two of the foremost figures in the history of Polar exploration—Rear Admiral Robert E. Peary, discoverer of the North Pole, and Major-General A. W. Greely, leader of the Greely International Polar Expedition of 1881-'84, and for 14 years holder of the record for the Farthest North.

ADMIRAL PEARY'S LAST PUBLIC APPEARANCE

It was at this meeting of The Society that Admiral Peary made his last public appearance to pay the following tribute to his fellow-explorer:

"Fellow-members of the National Geographic Society:

"Today we add another to the long list of Polar explorers, both north and south, whom our Society has welcomed and to whom our members have listened with absorbing interest.

"Six years ago, in the parlor of a hotel in Rome, I said good-bye to another confident young friend of mine who was starting then for home in order to begin one of our latest Polar quests. I met him here today for the first time since then. How much has happened to him in those six years I need not attempt to relate. Five and one-half years of those six this man has been there in the Arctic regions adding to the sum of the world's knowledge. Five and one-half years!

A NEW TYPE OF EXPLORER COMING

"It is not my intent to go into a résumé of his work. He is going to tell you that himself, but I can note very briefly that within that time Stefansson has added more than 100,000 square miles to the maps of that region—the greatest single addition made for years in Arctic regions. He has outlined three islands that were entirely unknown before, and his observations in other directions, the elimination of the continental shelf, filling in of unknown gaps in the Arctic archipelago, and his help in summing up our knowledge of those regions are in fact invaluable.

"Stefansson is perhaps the last of the old school, the old régime of Arctic and Antarctic explorers, the worker with the dog and the sledge, among whom he easily holds a place in the first rank. Coming Polar explorers, both north and south, are quite likely to use modern means which have sprung into existence within the last few years.

"According to my own personal impressions—aërial flights; according to Stefansson, he would like to try his chances with a submarine; but whether it be aëroplane or submarine, it will mean the end of the old-time method with the dog and the sledge and man trudging alongside or behind them.

"What Stefansson stands for is this: he has grasped the meaning of Polar work and has pursued his task in the Arctic regions section by section. He has profited by experience piled upon experience until he knows how to face and overcome every problem of the North. His method of work is to take the white man's brains and intelligence and the white man's persistence and will-power into the Arctic, and supplement these forces with the wood-craft, or, I should say, polar-craft, of the Eskimo—the ability to live off the land itself, the ability to use every one of the few possibilities of those frozen regions—and concentrate on his work.

"Stefansson has evolved a way to make himself absolutely self-sustaining. He could have lived in the Arctic fifteen and a half years just as easily as five and a half years. By combining great natural, physical, and mental ability with hard, practical, common sense, he has made an absolute record.

"Stefansson has not only fought and overcome those ever-present contingencies of the Arctic region—cold and hunger, wet and starvation, and all that goes with them—but he has fought and overcome sickness—first, typhoid; then pneumonia, and then pleurisy—up in those forbidding regions, and then has been obliged to go by sled four hundred miles before finding the shelter of a hospital and the care of a physician."

GENERAL GREELY'S TRIBUTE TO STEFANSSON

Major General Greely likewise paid a memorable tribute to the Hubbard Gold Medalist:

"At this meeting of the members of the National Geographic Society to do honor to an American explorer, there rises in my mind a throng of memories of that three years of Arctic service, so far buried in the past, when it was action, action, always action, and not, as now, the uttering of a word.

"The Bible tells us that Isaiah saw a

word—that is, a vision over the Holy Land centering in known Jerusalem. We, too, had visions which were over the vast expanse of the white north, unseen by human eye since the dawn of creation. Though barren, desolate, unknown, and strangely mysterious, it has been a goal for the adventurous of all nations.

"Among such seekers we are honored tonight by the presence of two officers of the Russian navy, Lieutenants Nikolsky and Evgenoff. With Captain Vilkitsky, they were the first to navigate from east to west the Siberian ocean, from Bering Strait to the North Sea. They also gave to the world a new Arctic archipelago, Nicholas II Land, north of Cape Chelyuskin, the promontory that projects farthest into that ice-encumbered sea. They were brought near in sympathy and helpfulness to the speaker of the evening, for they tried, though in vain, defeated by the pack, to rescue the survivors of the *Karluk*, then marooned on Wrangell Land.

"We come together especially to welcome back Vilhjalmur Stefansson, whose published obituary you have read, but who insists with Mark Twain that the account of his death has been greatly exaggerated. However, it told indirectly the tale of his dangers and hardships.

"THE WORLD'S RECORD FOR CONTINUOUS POLAR SERVICE"

"Stefansson has several unique Arctic records. His five and a half years is the world's record for continuous Polar service. A pioneer in living on the game of the region, whether on the ice-covered sea or on the northern lands, he also initiated distant journeys on the ice-floes of an unknown sea, which carried him hundreds of miles from the nearest land.

"The contributions of his expeditions are important and extensive. Besides the natural history and geologic knowledge, he has made inroads into the million square miles of unknown Arctic regions, the largest for many years. His hydrographic work is specially important, in surveys and in magnetic declinations. His numerous soundings not only outline the continental shelf from Alaska to Prince Patrick Island, but also disclose the submarine mountains and valleys of the bed of Beaufort Sea.

"From the unknown regions of Arctic land and sea he has withdrawn areas amounting to approximately 100,000 square miles. These discoveries comprise about 65,000 square miles of Beaufort Sea to the north of the Mackenzie basin, 10,000 square miles of the Arctic Ocean west of Prince Patrick Island, over 3,000 square miles along the northeast coast of Victoria Island, and over 15,000 square miles of land and sea to the northeast of Prince Patrick Island. In the last-named region three large and other small islands were discovered between latitude 73 degrees and 80.2 degrees north and between longitude 98 degrees west and 115 degrees west.

"These new islands unquestionably fill in the last gap in the hitherto-unknown seaward limits of the great Arctic archipelago to the north of the continent of America.

"The spirit as well as the material results of exploration should be recognized. Tonight the borderland of the White Sea is in the thoughts and hearts of many, for there, in the gloom of Arctic twilight, and in the cold of a Polar winter, the heroic men of this great nation are enduring fearful hardships and periling their young lives to restore peace and give freedom to unfortunate Russia.

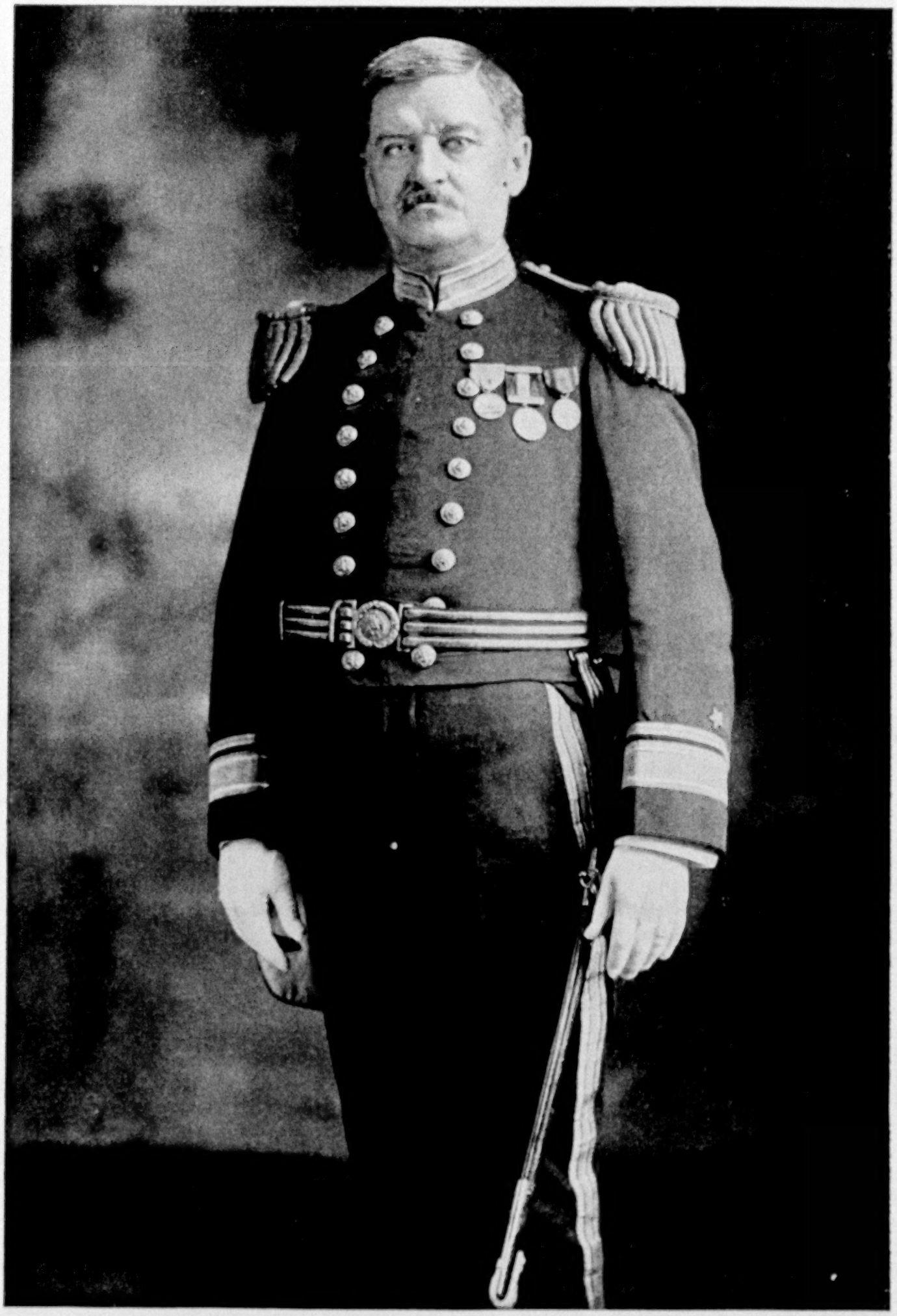
"Recall that in the dawn of that nation's history, through this sea and the port of Archangel only could Russia be reached. More than three and a half centuries ago, the first great maritime expedition of England sailed to the White Sea, and Chancellor's visit had potent results in the development of both England and Russia.

"Of this great voyage Milton said: 'It was an enterprise almost heroic were it not for gain.' Stefansson's explorations are untainted by motives of materialism.

"WE WHO ARE ABOUT TO DIE SALUTE HIM"

"In recognition both of the idealistic spirit and of the geographic importance of the discoveries made by Vilhjalmur Stefansson, the Board of Managers of the National Geographic Society unanimously direct me to present to him the Hubbard Medal.

"It is to be added that the three survivors of the so-called Greely Interna-



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REAR ADMIRAL JOHN ELLIOTT PILLSBURY, U. S. N., LATE PRESIDENT OF THE NATIONAL GEOGRAPHIC SOCIETY

The distinguished naval officer and authority on the Gulf Stream, who died December 30, 1919, had been a member of the National Geographic Society's Board of Managers for more than ten years, and had served as its Vice-President from 1915 until his election to the Presidency of the organization, April 16, 1919.

tional Polar Expedition are too far advanced in years again to hazard Polar work; but as explorers of the 19th century who first wrested from England a record held for three hundred years—that of the farthest north—they wish to honor the explorer of the 20th century who surpasses them.

"Appreciative of Stefansson's endurance of hardships, recognizing his ability in devising new methods, his courage in testing such methods, and his standing as a typical Arctic explorer, the members of the Greely Expedition, who are about to die, salute him."*

EIGHT GEOGRAPHERS AWARDED JANE M. SMITH LIFE MEMBERSHIPS

The Society also recognized the achievements of eight other distinguished geographers by electing them to life membership under the terms governing the endowment fund of $5,000 bequeathed by the late Miss Jane M. Smith, of Pittsburgh. The men thus honored were:

Rear Admiral Joseph Strauss, U. S. N.; E. W. Nelson, Frank G. Carpenter, Prof. Robert F. Griggs, Walter T. Swingle, O. F. Cook, William H. Holmes, and Stephen T. Mather.†

Reasons underlying the choice of these men of science reveal a fascinating story of geographic achievement.

Checking Germany's U-boat warfare by the North Sea mine barrage is universally accounted to have been a major factor in the Allied victory. Preliminary to this gigantic task a needful element to the success of the operation was a study of the geography of the North Sea region—a study made by Rear Admiral Joseph Strauss, who was in command of the expeditions that laid and removed the mines.‡

Beside this recent mark of distinction, Admiral Strauss already was known for his invention of the superposed turret system of mounting guns on battleships, for his part in the blockade of the Cuban coast, for his experimental work in torpedoes, and for his writings on ordnance and ballistics.

Walter T. Swingle's name is associated with the American raising of Smyrna figs; for until he introduced the insect necessary for fertilization of this variety, at Fresno, California, in 1899, the imported fig trees grew, but bore no fruit. Mr. Swingle has also devised numerous improvements to microscopes, made agricultural explorations in many lands, originated "citranges" by hybridization, in Florida, and introduced the date palm, pistachio nut, and other plants of Mediterranean origin into the United States.

Known to every student of animal life is the work of Edward W. Nelson, Chief of the U. S. Biological Survey, who has contributed notably to the information concerning animal life of North America, from the time when he conducted pioneer scientific explorations in Alaska, forty years ago, to his more recent expeditions to examine the zoölogy and botany of Mexico. Results of a major line of his investigations have been published by the NATIONAL GEOGRAPHIC MAGAZINE and later by the Society in a volume entitled "Wild Animals of North America."

A GREAT TEACHER

No less important than the increase of geographic knowledge, the National Geographic Society has always held, is its diffusion, and on this basis, especially, recognition was accorded Frank G. Carpenter. First as a newspaper correspondent, later as a travel writer, and also as an author of some admirable school geographies, Mr. Carpenter has stimulated interest in geographic knowledge and made intelligible to the general public a vast amount of informative data.

O. F. Cook was honored for his studies of Machu Picchu, the lost city of the Incas, which was found by Colonel Hiram Bingham, leader of the National Geo-

*A most interesting article, "The Development of Northern Canada," by Mr. Stefansson, will appear in an early number of THE GEOGRAPHIC.

† Only five other life memberships have been awarded previously under the provisions of Miss Smith's bequest, those being to Colonel Hiram Bingham, Colonel Alfred H. Brooks, Dr. William H. Dall, George Kennan, explorer and first Secretary of the National Geographic Society, and Henry Pittier.

‡ See NATIONAL GEOGRAPHIC MAGAZINE, February, 1920, and February, 1919.

graphic Society's Peruvian expeditions. In the vicinity of Machu Picchu were discovered many remarkable ruins of a pre-Columbian civilization, including the wonderful hanging gardens, where it is thought that great food resource, the potato, originated.*

Prof. Robert F. Griggs was honored for service rendered to science while at the head of National Geographic Society expeditions to Mount Katmai (see page 338).

William Henry Holmes, now Head Curator of Anthropology, National Museum, has left his impress both in science and art. In the former field his original work in ethnology, archeology, and geology have valuable geographic significance.

In recognition of his substantial service in the upbuilding of the national park system, of the marked impetus he has given to interest in America's natural beauties and wonders, and his success in making these national play places accessible, Stephen T. Mather, Director of the National Park Service, was elected a Jane M. Smith life member.

THE GEOGRAPHIC MAGAZINE GOES TO 750,000 HOMES

Month by month The Society's official organ, the NATIONAL GEOGRAPHIC MAGAZINE, with a steadily increasing number of readers, has been instrumental in diffusing geographic information in 750,000 homes by removing the padlock of technicality from the most inclusive of all sciences—that which "treats of the earth and its life, the description of land, sea, and air, the distribution of plant and animal life, including man and his industries, with reference to the mutual relations of these diverse elements."

The Society has a warehouse full of map paper, representing an investment of $50,000, and as soon as the various commissions have defined the new frontiers of Europe, Asia, and Africa, it is the intention of the Magazine to print a complete set of maps.

Two recent numbers have been especially noteworthy contributions to knowledge—the Dog Number, with color portraits of 73 species of man's historic and best-loved animal friend, and the Military Insignia Number, of special value and interest to the 4,000,000 Americans who were in the uniformed service of their country during the World War, and to their relatives and friends. The latter number, superbly illustrated in colors, gave an epitomized history of the medals, decorations, ribbons, and organization shoulder insignia authorized by the United States Government, and proved an especially valuable sequel to The Society's famous Flag Number of October, 1917.

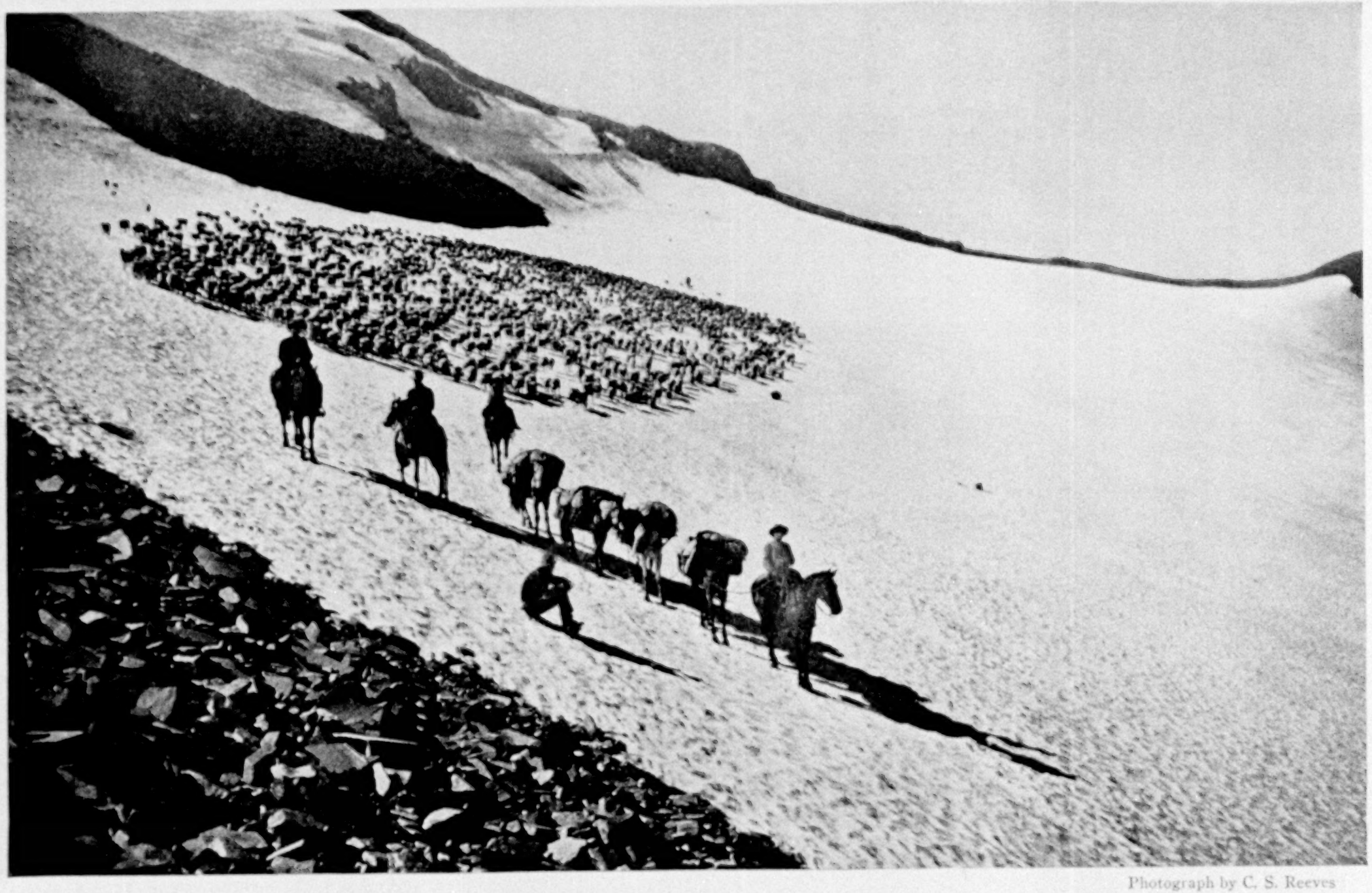
GEOGRAPHIC BULLETINS REACH TWELVE MILLION READERS

Through the columns of more than 550 of the leading American newspapers, The Society's daily Geographic News Bulletins are reaching twelve million readers. By means of these bulletins, which are furnished to the daily press without charge, The Society is enabled to interpret the historic and geographic backgrounds which give significance to news dispatches from every corner of the globe.

So important have these bulletins proved as an educational force, that through the co-operation of the United States Department of the Interior, Bureau of Education, the urgent appeals of more than 60,000 school teachers have been met and this geographic information, in attractive illustrated form, is now being issued weekly for class-room use. Thus educators in every State of the Union are receiving the assistance of The Society in vivifying and vitalizing for their pupils the mere names of places into communities where human beings live and move and have their being.

A further educational activity inaugurated by The Society in recent months is its PICTORIAL GEOGRAPHY. By means of this series of loose-leaf geographic text and pictures, the bewildering "dots and dashes" of the average map and the technical phraseology of physical geography are deciphered into mental pictures of busy places, living peoples, beautiful landscapes, Nature's moods and processes, for America's millions of school children.

* See "Staircase Farms of the Ancients" by O. F. Cook, NATIONAL GEOGRAPHIC MAGAZINE, May, 1916.



Photograph by C. S. Reeves

CROSSING PACKWOOD GLACIER, GOAT MOUNTAINS, WASHINGTON, WITH TWENTY-FOUR HUNDRED SHEEP, AT AN ALTITUDE OF 7,500 FEET

DEATH REMOVES THREE DISTINGUISHED LEADERS

Unhappily, The Society's most successful year has been saddened by the death of three of its leaders—Brigadier-General John M. Wilson, Rear Admiral John E. Pillsbury, and Rear Admiral Robert E. Peary.

General Wilson, who had been a member of The Society's Board of Managers for fourteen years, had a distinguished military career. He was at one time Superintendent of the United States Military Academy at West Point, was Chief of Engineers of the Army during the Spanish-American War, and, to quote from the resolutions passed by his colleagues on The Society's Board, following his death, "It is a noteworthy coincidence that the Washington Monument, ideal symbol of the character of the first President of the Republic, was completed under the direction of General Wilson, thus serving as a memorial to an officer and public servant of similar integrity of character and unselfish service to his fellow-men."

THE LATE PRESIDENT ADMIRAL PILLSBURY

In the death of Admiral Pillsbury, on December 30, 1919, The Society lost its President and a distinguished contributor to its magazine. As a naval officer he served with distinction during the Spanish-American War, being in command of the dynamite cruiser *Vesuvius* at the siege of Santiago, but it is on account of his notable work in studying the Gulf Stream that Admiral Pillsbury's name is written largest in the history of his country.

As commander of the Coast Survey steamer *Blake*, he employed a device of his own invention to anchor that vessel in depths of more than two miles, and studied currents there by means of contrivances also of his own making. Thus, after seven years of study, he established the position of the axis of the Gulf Stream and determined many of the laws by which its flow is governed.

A digest of his work in this important field of oceanography was written for the NATIONAL GEOGRAPHIC MAGAZINE and published in August, 1912. Admiral Pillsbury became a member of The Society's Board of Managers in 1909, was elected Vice-President in 1915, and became President April 16, 1919.

An outline of the career of Rear Admiral Peary, the third member of the Board of Managers to be removed by death within recent months (February 19, 1920), is given in the preceding pages of this number of THE GEOGRAPHIC.

THE NEW PRESIDENT

Upon the death of Admiral Pillsbury, the Board of Managers of The Society elected as his successor to the Presidency Gilbert Grosvenor, for twenty-one years the Editor of THE GEOGRAPHIC MAGAZINE and the Director of The Society. Under Mr. Grosvenor's direction, the membership of The Society has increased from 900, in 1899, to more than 750,000. Mr. Grosvenor continues as the Editor.

John Oliver La Gorce, Vice-Director of The Society and Associate Editor of the magazine, was elected to succeed to the place on the Board of Managers left vacant by Admiral Pillsbury's death.

In the history of civilization, there is no other instance of a vast coöperative educational and scientific association organized and developed like the National Geographic Society and commanding such widespread public support.

It is not a commercial enterprise but an altruistic institution, and the only dividend which it pays is the geographic knowledge it disburses primarily to all its members and secondarily to the world at large.

In The Society's constructive service to humanity in a wounded and distrustful world, its members have cause for pride and personal satisfaction. As their agency, The Society is one of the most effective forces in bringing about a better understanding among the nations of the world. To millions of Americans, The Society's pictures and descriptive articles have made foreign races and their lands human realities rather than mere dots on maps or political boundary lines.

The Society has grown because it ministers to the basic desire of intelligent citizens to understand other peoples and to know better the earth whence they derive their livelihood.

XUM

THE SALVATION ARMY IN INDIA

The British Government has entrusted to the Salvation Army the management of its numerous criminal tribes of the hill country and the problems of the poor.

AROUND THE WORLD WITH THE SALVATION ARMY

By Evangeline Booth

Commander Salvation Army

FOR more than half a century the historic banner of the Salvation Army has been raised over the battered towers and broken gates of despairing, wounded humanity, but half of the world never knew about it. It took the blood and agony of a great war to demonstrate the fire of a faith which has planted its standards in every country on the earth.

"Around the world with the Salvation Army" is not a challenge or a prophecy; it is an accomplished fact.

The Army is working in sixty-three countries and colonies, preaching the gospel in forty languages. Our periodicals, printed in thirty-nine different languages, reach a circulation of 1,184,000 a week. More than 23,000 officers and cadets plan and execute our strategy against insidious foes—poverty, sin, sickness, and despair. It was for that we were called an army.

Wherever there is an earthquake, a fire, a world war, or any great human need, there you will find the Salvation Army. It seems quite natural to report that more than 105,000 Salvationists fought in the different armies on the Allied fronts.

So, step by step, the Army is marching on. It has crossed lances with Buddha and Confucius. Offering ministration to the forgotten ones in desolate places, Salvation Army lassies and men have gone into leper colonies and planted the Cross on pagan soil.

INTENSIVE TRAINING FOR SALVATION ARMY OFFICERS

Few have even a remote idea of the extensive training given to all Salvation Army officers by our military system of education, that covers all the tactics of the particular warfare to which they have consecrated their lives—*the service of humanity*. We have in the Salvation Army thirty-nine training schools in which our men and women, both for our missionary and home fields, receive intelligent tuition and practical training in the minutest details of their service.

They are trained in the finest and most intricate of all the arts, the art of dealing ably with human life.

It is a wonderful art which transfigures a sheet of cold, gray canvas into a throbbing vitality, and on its inanimate spread visualizes a living picture.

It is a wonderful art which takes a rugged block of marble, standing upon a wooden bench, and cuts out of its uncomely crudeness—as I saw it done—the face of my father, with its every feature illumined with prophetic light, so true to life that I felt that to my touch it surely must respond.

But even such arts as these crumble: they are as dust under our feet compared with that much greater art, *the art of dealing ably with human* life in all its varying conditions and phases.

It is in this art that we seek by a most careful culture and training to perfect our officers.

They are trained in those expert measures which enable them to handle satisfactorily those who cannot handle themselves; those who have lost their grip on things, and who, if unaided, go down under the high, rough tides.

Trained to meet emergencies of every character; to leap into the breach; to span the gulf; to do it without waiting to be told how.

Trained to press at every cost for the desired end.

Trained to obey orders willingly and gladly and wholly, *not in part*.

Trained to give no quarter to the enemy, no matter what the character, nor in what form he may present himself.

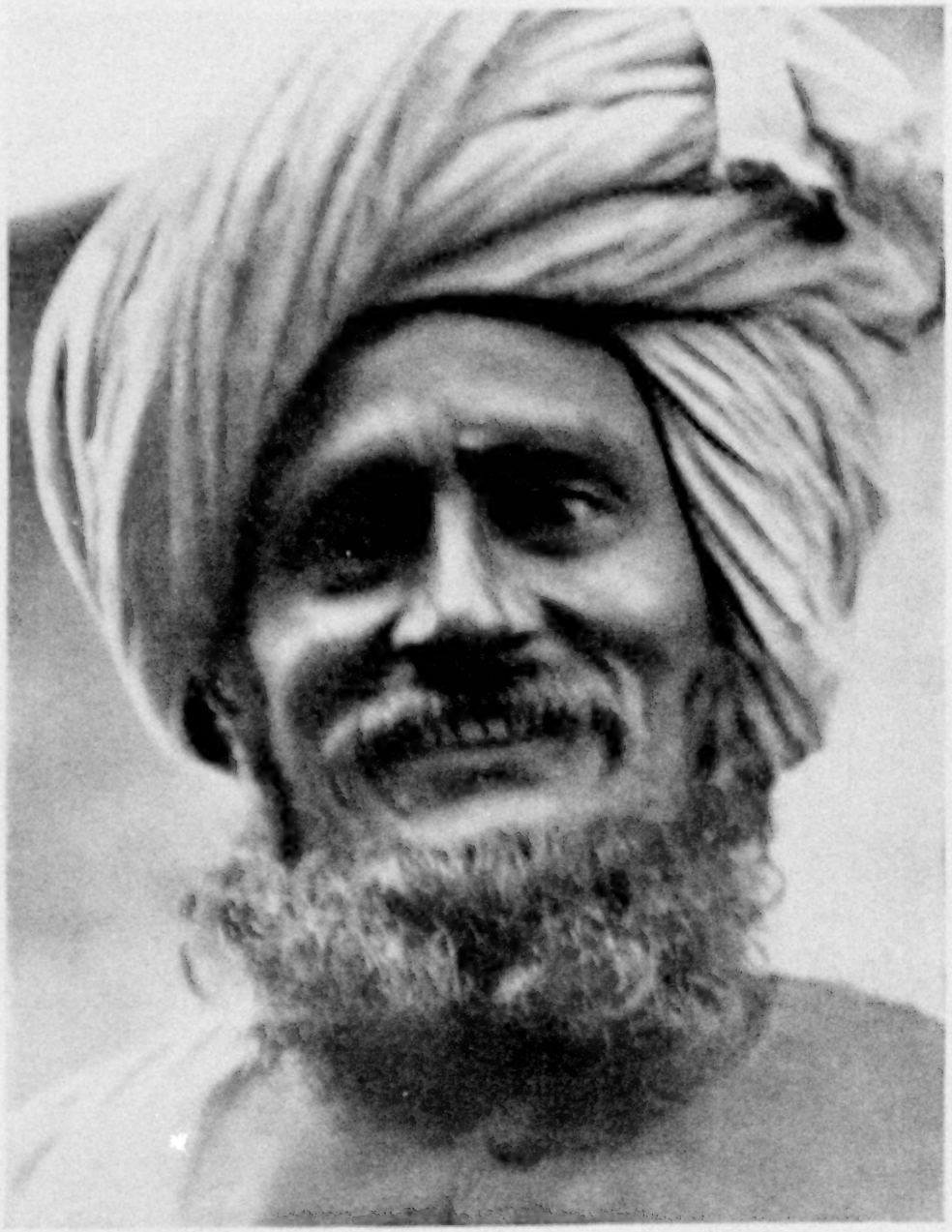
Trained in the art of the winsome, attractive coquetries of the round, brown doughnut! And all her kindred.

THE HINDU VERSION OF THE BASS DRUM, TAMBOURINE, AND TRUMPET

The Salvation Army Empire is a tangle of races, tongues, and colors, of types of civilization and enlightened barbarism such as never before were gathered under one flag.

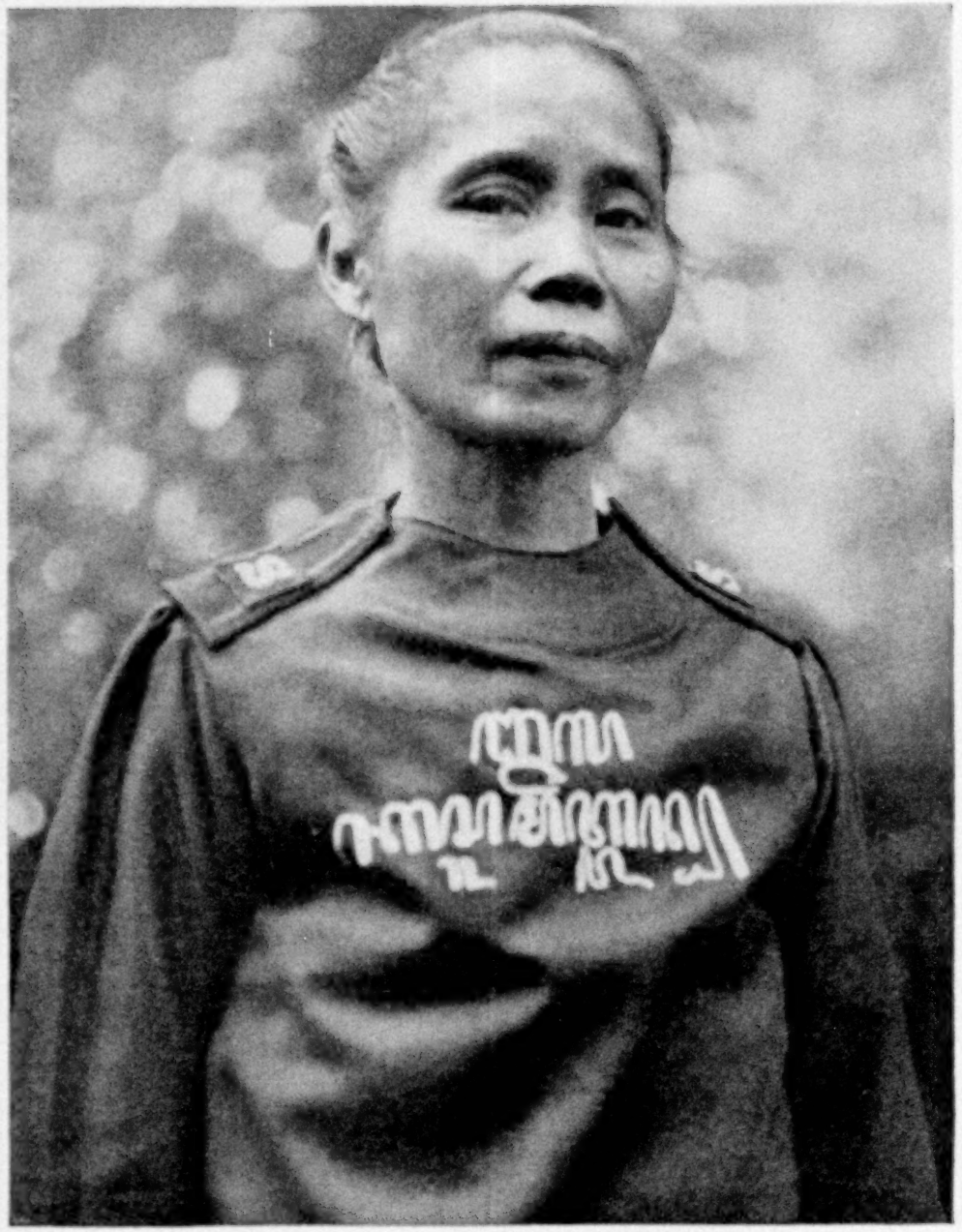
ON INDIA'S CORAL STRAND: A SALVATION ARMY HOME FOR GIRLS IN FAR-OFF HINDU LAND

Seventy-one nationalities are now marshaled under the Salvation Army's Banner of Blood and Fire, working to destroy idols of wood and stone, and to convert temples into such homes as this.



ONCE AN OUTLAW, NOW A SOLDIER IN HUMAN SERVICE

This chieftain of an East Indian criminal tribe has become a Salvation Army worker in charge of one of the Army's farm colonies.



THE SALVATION ARMY LASSIE OF JAVA

The curious inscription on the uniform of this swarthy-complexioned Far East worker means "Salvation Army."

Trained, if needs-be, to seal their services with their life blood.

One of our women officers on being told by the colonel of a regiment that she would be killed if she persisted in serving her doughnuts and cocoa to the men while under heavy fire, and that she must get back to safety, replied: "Colonel, we can die with the men, but we cannot leave them."

SEVENTY-ONE NATIONALITIES UNDER ONE BANNER

By imperial decree the Emperor of Japan recently granted an annual fund for the work of the Salvation Army in his kingdom. India has turned over to the Army the management of its great criminal tribes and the problems of its poor.

As the work has grown, it has been increasingly apparent that the faith which regenerates men recognizes no barrier of nationality or geographical limitation. Seventy-one nationalities are now marshaled under the banner of blood and fire, working to destroy old idols of wood and stone and turning the temples of the gods, after due cleansing, into Christian meeting-places.

The work in India will be forever linked with the name of its pioneer commissioner, F. de Latour Booth Tucker. Judge Tucker was greatly interested in the Salvation Army while in the service of the British Crown in India in the early days of the movement. There came a time when he gladly resigned his government position, with all that it meant to him personally in the way of official success, and came into the Army to wear the flowing robes of the natives and to extend the work in the very heart of the continent.

Salvation Army settlements for criminal tribes are unique in the annals of social work throughout the world. Out in the hill country there are entire tribes of criminals for which the prevailing caste system is largely responsible. They marry and intermarry, and their children, born outcasts, are doomed to go through life branded as criminals.

For years these Ishmaelites have been a source of constant worry to the British Government. Finally, in an effort to reach a practical solution and meet the growing need, the government turned over the management of these tribes to the Salvation Army.

Sir John Hewett came to terms with General Booth. The British Government agreed to provide the territory and the Salvation Army undertook to provide the men. The criminal tribes were to be brought into a certain territory and the Salvationists were to be responsible for their regeneration.

It was Harold Begbie who first reported the historic meeting of Sir John Hewett, then Lieutenant-Governor of the United (Indian) Provinces, with my father, the late General and founder of our organization.

Sir John had heard of the Army's work in salvaging men, and it struck him at once that similar methods might be successful with the wandering tribes which roamed the hills, a menace to the people and a vexing political problem. He visited General Booth and together these two, so unlike in many ways, discussed methods of reclaiming men, of making them over into useful citizens.

"YOU CANNOT MAKE A MAN CLEAN BY WASHING HIS SHIRT"

The old patriarch brought to the mind of the statesman one of the great fundamental truths of human experience, too often neglected by legislators and sometimes conveniently ignored by the enemies of religion:

"You cannot make a man clean by washing his shirt," General Booth exclaimed. "If you have a bad man to deal with, you must first seek to alter the set and current of his soul. I will tell you the secret of governing tribes and nations of evil-doers. It is religion.

"Give them religion. If you alter the circumstances of a man's life, and set him in conditions where his liability to vice is small, and where he knows his sins will be most surely punished, you will not go far, if that is all you have to give him.

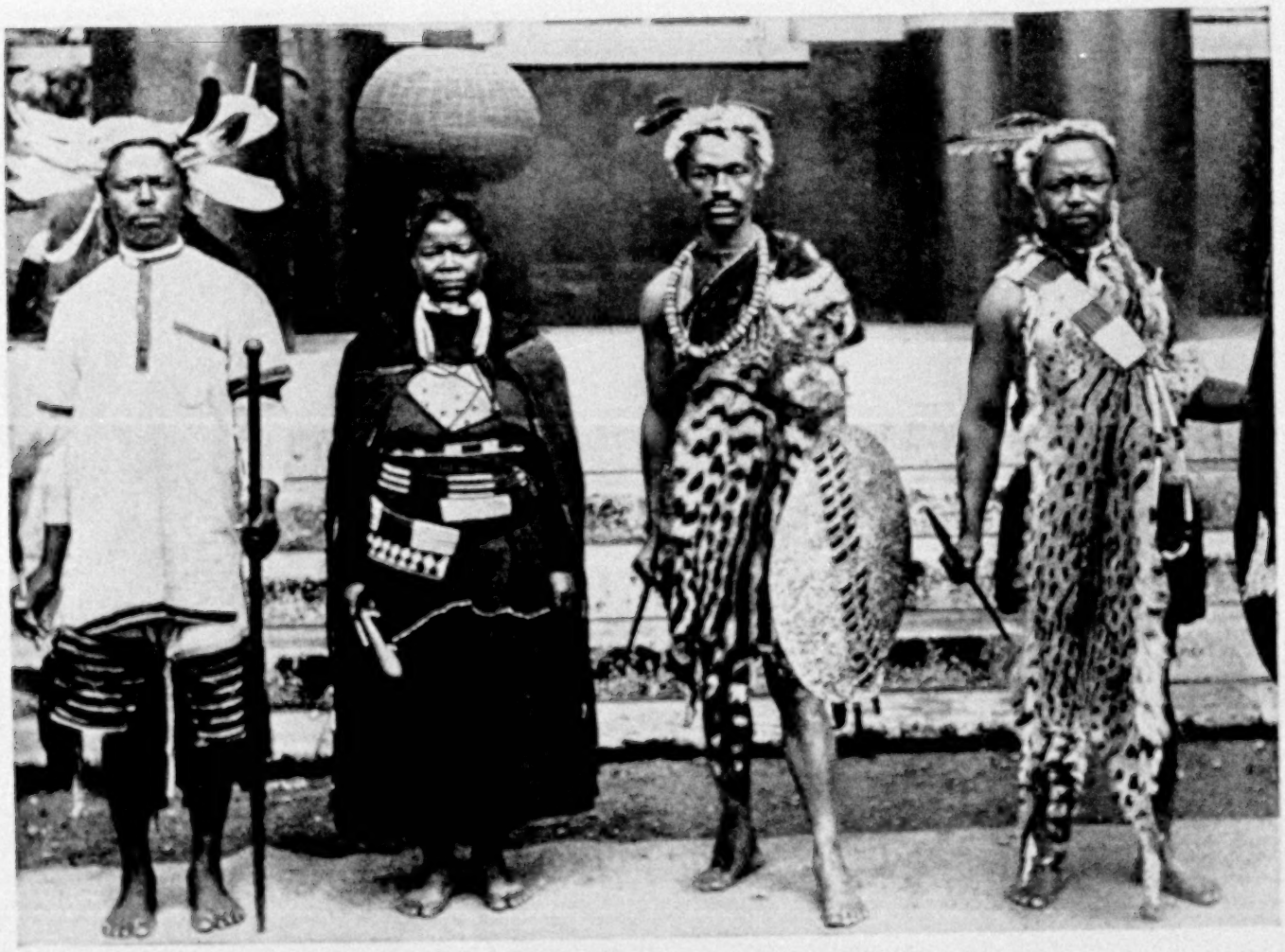
"You cannot deal with the body of a man when it is his soul that is the cause of all the trouble; that is to encounter

HINDU RECRUITS OF THE SALVATION ARMY IN INDIA

Note the Mohammedan woman, who, despite her adoption of the Christian faith, adheres to the practice of her people in shielding her face from the eye of the camera.

A HOME-MADE SALVATION ARMY BAND IN INDIA

The Salvation Army workers in the Far East are no respecters of the man-created caste system which has blighted oriental life for centuries.



ZULU WARDS OF THE SOUTH AFRICAN BRANCH OF THE SALVATION ARMY

"We look through the exterior, look through the shell, look through the coat, and find the man."

A SALVATION ARMY HOME FOR NATIVE BOYS IN JAVA

This organization now has 21,000 commanding officers who voice their doctrine of deeds in forty tongues.

WITH THE SALVATION ARMY IN JAVA

The man at the reader's right is wearing the regulation Salvation Army uniform of the Javanese branch of this world-wide organization.

inevitable failure. Only one power is known in all the long experience of human history by which a bad man can become a good man, and that power is religion."

Years passed and the work of the Salvation Army strengthened and grew. There was just one way to success, and that was to remake men into some semblance of law-abiding, useful citizens. It was the human equation which counted and by this test must the work of the Salvation Army be gauged in India, as elsewhere.

"Boom marches" constitute a phase of the work conducted in India. Groups of four or five Salvationists in native dress tramp the roads that lead into the interior. From the roadside in heathen villages and towns they proclaim with simplicity and force the unsearchable riches of Christianity. In careful detail they explain what it all means to the head man of the village tribe.

Very often the villagers keep the marchers with them and ask them for songs and music, and very frequently they ask for instruction in the Christian religion.

These marchers go far afield, reaching out to all classes in India, irrespective of the man-created caste system which has brought about conditions in the Far East not easy to overcome.

THE SALVATIONISTS AMONG THE CHINESE

Long before Christian missionaries went forth to fulfill the divine behest, "Preach the gospel to every creature," there existed a Chinese nation, with its vast possibilities for happiness and for good. Only the Egyptians, the Assyrians, and the Jews were their contemporaries.

Three and a half centuries have passed

THE ORGANIZATION'S HEADQUARTERS IN TOKYO: THE SALVATIONIST'S COUNTRY IS THE WORLD

"We recognize our brother in all the families of the earth."

since Saint Francis Xavier, in his dying hour, exclaimed in an agony of despair over his supreme discouragement in trying to evangelize China, "Oh, rock, rock, when wilt thou open?"

Years have passed since Napoleon, with far different motives, looked on the ancient century-defying nation and said, "The giant is asleep. Do not awake him."

But now the rock has opened, the giant is awake.

For years these people lay heavily on my father's heart. Their needs were continually discussed; they were the foundation of some of his most burning public utterances. He saw them in his dreams by night and thought and planned for them by day. Somehow I feel he still waits and watches for their salvation from the battlements of glory.

Our present General's deep and passionate interest in China is well known. All during the war the Army's blood-and-fire flag was raised beside that of the new Chinese Republic, while the work was steadily carried on by heroic men and women who labored as pioneers.

A new corps was recently opened in Peking. The hall is situated in the northeastern part of the South City, in the busiest commercial district. The building was formerly used as an old food shop. It has been remodeled until it can now care for about 250 people.

A VENTURE OF FAITH

Beyond the great wall, to the north of Tatungfu, lies Fengchen. Back in this robber-infested district the Army made its first venture of faith into the interior of China. No part of the earth is too far removed for the truth to reach it, and the Salvationists, unarmed and unescorted, trailed their way into the mountains to preach to brigands and robbers.

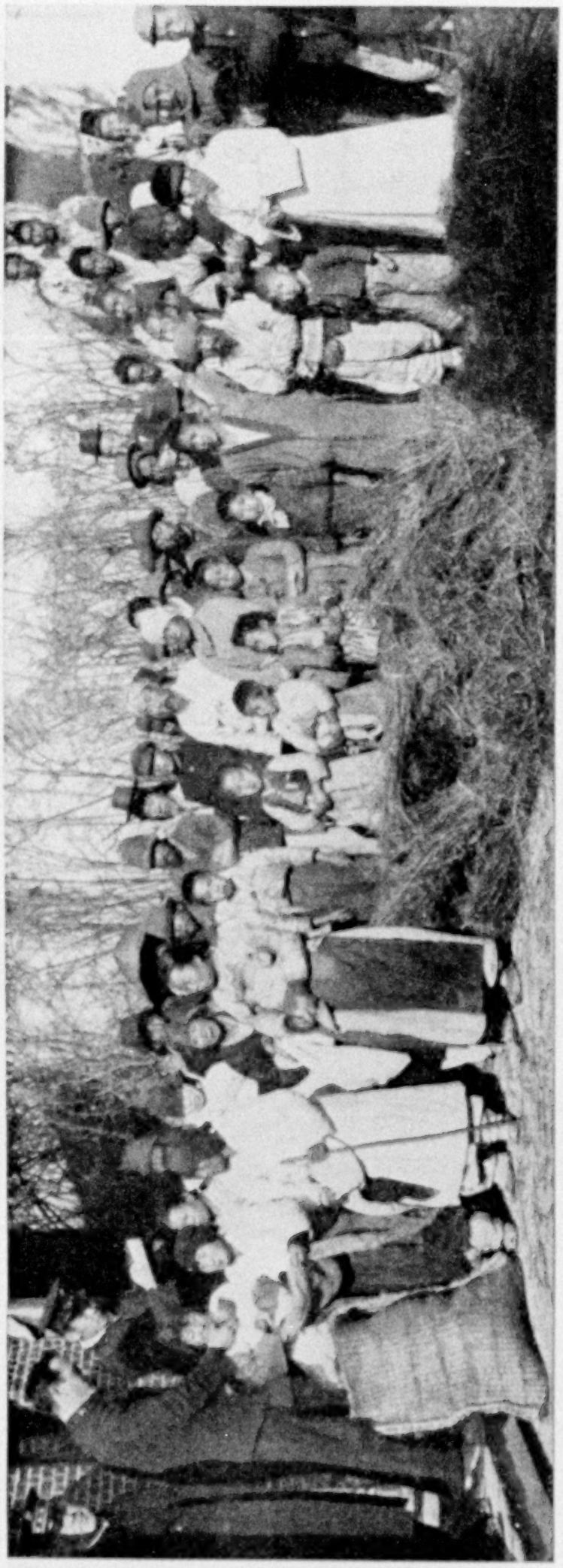
GENERAL WILLIAM BOOTH, THE GRAND OLD MAN OF THE SALVATION ARMY, ADDRESSING A MULTITUDE IN JAPAN

"Some men's passion is gold; some men's passion is art; some men's passion is fame; my passion is man!"

XUM

A STREET CORNER SALVATION ARMY MEETING IN THE HEART OF JAPAN

Twenty-one national governments recognize the inestimable service rendered by this organization, according it official financial support.



DISTRIBUTING RICE TO NEEDY KOREANS

The Salvation Army maintains that, as suffering recognizes neither race nor creed nor clime, human service should be equally cosmopolitan.

One of the few policewomen in China lives at Tatungfu, in the northern part of the Shansi Province. The Salvation Army made its first visit to Tatungfu a year ago, and now the town boasts this very progressive guardian of the peace, who delights in wearing a brass badge on her arm and in carrying a cane. It is her duty to see that small girls in the vicinity are not subjected to foot-binding.

Fifteen or twenty young girls from a near-by government school recently called upon the Salvation Army officers, who sang for them and taught them to sing a few choruses of simple hymns. They were greatly impressed. One of the girls admitted that she was interested, but she had always imagined that God loved only foreigners!

The territorial leader for northern China arrived in Peking early in 1918. He found 30 officers, who had been wrestling with the difficulties of the Chinese language for nearly a year, able to lead meetings and to give simple talks which could be understood by the people. They were eagerly waiting their appointments in the country of their adoption.

Very often our officers and cadets carry their beds with them, as the Chinese do when traveling. A thin mattress filled with cotton and a small coverlet and pillow are rolled into a case and carried as luggage.

Tientsin, the commercial capital of North China, recently opened three corps, with a contingent of nine officers, while Chengtingfu, a large walled city, and Men Lou, in the Shantung Province, have received officers and cadets.

The *War Cry*, issued by the Army press in China, is as popular over there as it is here. A song book has also been published containing translations of well-known popular Army songs.

THE ARMY TEACHES THE CHINESE TO SING

According to Western standards, the Chinese are not musical, but the Salvation Army has found a way to teach them to sing. A beginning is made by teaching songs to the children when a congregation does not seem to get the idea. Very soon the little ones are heard singing the favorite tunes of the Salvationists in the streets and lanes, and in this way they eventually have their elders singing with them.

During the winter of 1918 the Army did trencher duty for flood sufferers at Tientsin.

Korea is now receiving assistance from Salvationists sent especially for work in that country. Last winter rice was very high and the poor suffered greatly. The Army immediately established a free meal department and a station where rice and fuel could be purchased cheaply.

On account of the conversion of men who were formerly great drunkards, the wine shops in some of the villages of Korea lost so much trade that they were compelled to move to other places.

We started our operations in Korea in 1908. There are now 69 corps and outposts in that country, 106 officers, cadets and employees, and 175 local officers. At Seoul, in addition to the headquarters, there is a training garrison, citadel, and a school for girls.

In the East the translation of Salvation Army is "Army to Save the World."

LENDING A HAND TO THE LEPERS

It has often been said that the mass of men lead lives of quiet desperation; that what is called resignation is in reality "confirmed desperation." In its work around the world the Salvation Army has always thought first of the men who go about the day's business lost in the hopelessness of confirmed desperation.

There are men like that in the leper colony in Java, men who wait with grim certainty for the dark, dreadful, still years to pass. We have gone out to help them in order that these years may not be full of pitiful things. The men and lassies who go to these leper colonies can never come out.

They lay down their lives for those they go out to save.

Recently I received a report from a Salvation Army lassie who has spent four years in Java. The institution maintained by the Army at Boegangan cares for more than 360 patients, all native Javanese.

One Salvationist has already been smitten with the dread disease. Only by personal report can one visualize the need of these people. Last Christmas time we received this message from the officer in charge:

"We had a Christmas tree for them and they all received presents. Clothing was especially needed, as most of them have only one set of clothes, and when they wash these few rags they must wait for them to dry before dressing. Many of their clothes are in such a condition they are afraid to wash them, for fear there will be nothing left to put on.

"Of course, we have the poorest of the poor here at Boegangan; yet, with it all, I love my work."

When a lassie can face the world with such courage as that, in the midst of the greatest grief and loneliness human hearts can bear, where men live as outcasts, alone and forgotten by the world, we feel that our efforts are bearing fruit of untold value.

Even the Red Terror and Bolshevism could not keep the Salvation Army out of Russia.

Within three months after the opening of our work twelve outposts were established in various cities in Russia and several hundred soldiers and recruits, as well as thirty officers, were enlisted.

A training center for officers was started, two homes for refugee women and children were established, and a shelter for aged women opened. Since then our workers have installed five more corps.

Captain Larson, a Swedish officer, working from headquarters in Finland, was instrumental in forming the nucleus

WAITING AND WATCHING AT THE FRONT

Two Salvation Army girls standing at the door of their hut ready to cheer and minister to the World War soldier, whether wounded, weary, or homesick.

DOUGH FOR THE DOUGHBOY

It was not the Salvation Army doughnuts and pies themselves which won the hearts of American soldiers in France, but the spirit of good cheer with which the Salvation Army lassies rendered their every service.

of the Salvation Army in Russia at the time when its very existence was outlawed by the authorities.

In Petrograd our people are free to conduct meetings at the corners of the streets and in the parks.

FACING BOLSHEVISM IN RUSSIA

Unafraid of flying bullets, the Girl with the Tambourine sings and prays in the midst of street-fighting in Russia today.

One of our chief difficulties is that of traveling. Train service is unspeakable. Much of our work has been accomplished by traveling in sleighs in the winter time. Recently one of the lassies wrote to our headquarters in this country that a sleigh-driver informed her on one of these trips that all town lights must be out at 10.30, as that was the time set for the plundering to begin.

Trains so crowded that passengers had to cling to car couplings and precarious footholds on locomotives were a common sight. To spend the night thus, traveling in the bitter cold, in addition to other dangers, gives one some idea of the divine courage which it takes to carry the message through Russia during these dark days of fear and wild revolution.

In the early days of the Army in Japan, Colonel Gunpei Yamamuro, a native Japanese, wrote a book entitled "The Common People's Gospel." It was printed in native characters and had a phenomenal circulation among the masses, who thus learned, in the most direct sort of way, the first news of the gospel.

THE ARMY'S CRUSADE IN JAPAN

This book simply brought out once again the truth of Abraham Lincoln's assertion, that the Lord must have had a great love for the common people of the earth, otherwise He would not have created so many of them.

One of the first important accomplish-

"LIKE IT?"

Enthusiastic appreciation has come from the officers of the Allied armies in recognition of the services of the Salvation Army.

"YOU BET!"

But from the rank and file and from the mothers and fathers of the privates have come the most heartening tributes of gratitude.

ments in the land of cherry blossoms was the definite crusade against prostitution in Tokyo.

In the ultra-conservative Orient, for years prostitution had been looked upon as a social necessity. When Colonel Yamamuro understood what the Army had been doing for the protection of women all around the world, he decided that he would enlist its aid for the women of his own country.

He made a special appeal to the moral sense of the community. Then he prepared a special Rescue Edition of the Japanese *War Cry* and secured its entrée by thousands of copies into the segregated districts of the city. In the meantime homes were prepared for girls who might wish to change their mode of living.

A BITTER STRUGGLE AGAINST TRADITIONS OF THE EAST

Then began that long and bitter struggle against the traditions and customs of the East; but in the end the Army triumphed, with the help of the best elements in the ancient city. Today whatever of the "social evil" exists in Tokyo certainly exists as a voluntary and not a compulsory system.

Many of the prominent men in Japan are sponsoring the Army and all that it stands for.

For a period of ten years the Emperor has promised annual funds as an imperial contribution to further the work of the Army.

Relief-work was organized by the Salvation Army in Switzerland and in Italy for the benefit of the thousands of refugees who fled before the invading Austrians during the World War.

Officers were dispatched to Serbia to conduct relief-work, and when the Serbians began streaming into Italy, as early as January, 1916, the Army homes were crowded to their capacity. In connection with other work in the war zone, the Army organized to care for interned prisoners of war in Holland. This work later received special mention by the Dutch Government.

A new field recently entered by the Salvation Army is that opened in Portuguese East Africa.

At Bandoenig, Java, a new children's home has just been opened under the auspices of the Governor General's wife.

In connection with the Memorial Training College in Sweden, Commissioner Ogrim was successful in raising an endowment fund, to which the King of Sweden and Prince Bernadotte were among the principal contributors.

A WORLD CONGRESS OF SALVATION ARMY WORKERS

It was in 1883 that the Salvation Army first opened fire in South Africa. Now our organization is working in Zambesi, Rhodesia, and the desolate island of St. Helena. Seven industrial homes for women are now in operation in South Africa.

The story of the Salvation Army must be told as the history of a world-wide organization. Upon its flag the sun never goes down. There is a picture in my memory which illustrates this in a marvelous way. It is a picture full of wonderful color and brings back the gathering of our last international congress in Albert Hall, London.

There, under one great roof, 14,000 people were gathered from the ends of the earth, dressed as they were when the Salvation Army found them. The Zulu was there, with his shining brown shoulders and his loins girded with the skin of some wild beast of the snake-infested jungles; there was the yellow-skinned Chinaman, with the colors of his university, royal blue and dark yellow; there were the glossy-haired East Indians, with their scarlet cotton coats and yellow turbans; and Maori girls dressed in rainbow colors. The East Indians expressed all the Anglo-Saxon language they knew in the three words, "Salvation Army, hallelujah!"

DELEGATES IN WHITE FROM JAVA'S LEPER COLONY

In this picturesque gathering there were one or two who wore clinging snow-white garments. They came from the sad little island of Java, where Salvation Army men and lassies give their lives to help the lepers.

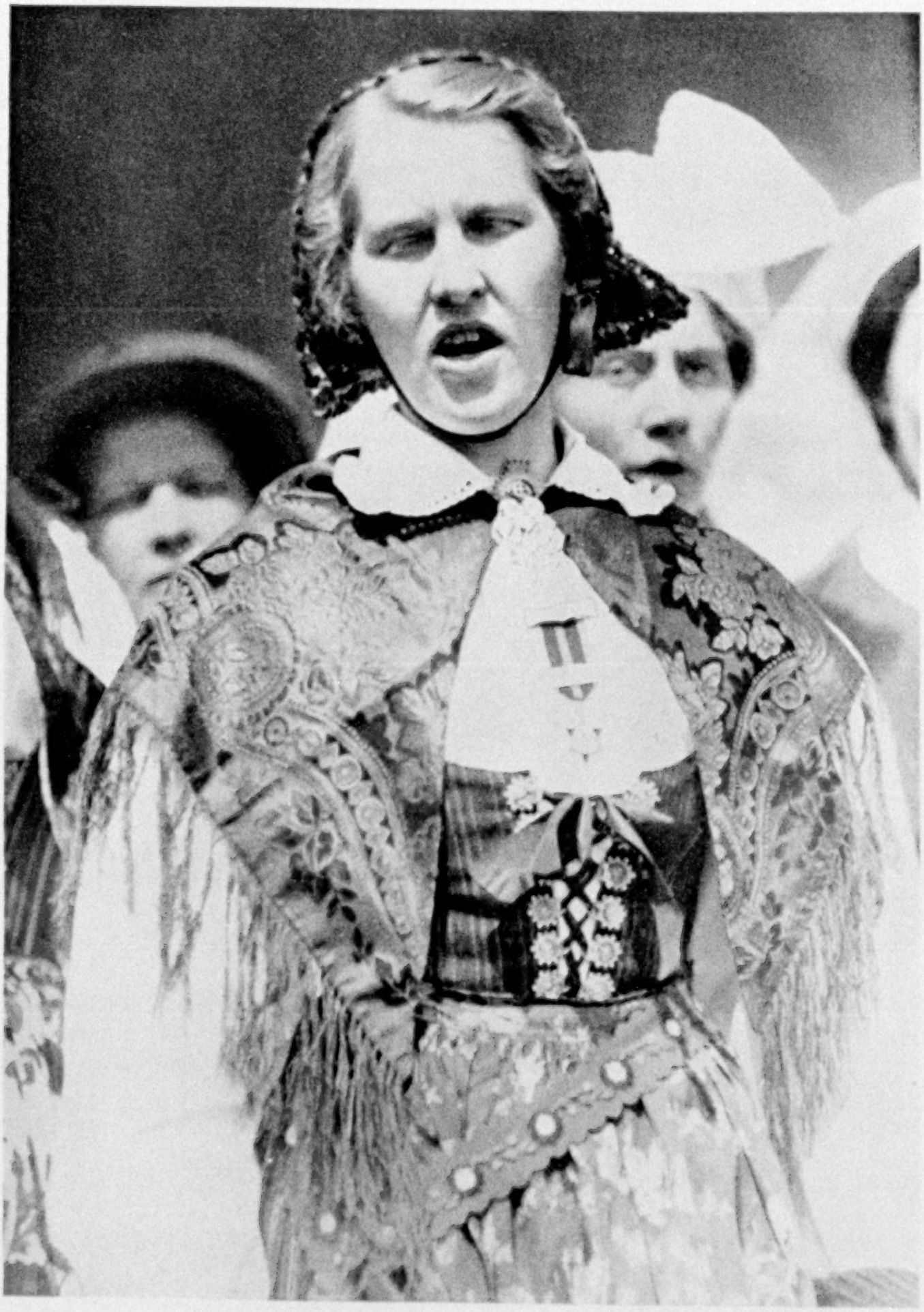
There were picturesque mountain-climbers from the Alps, with their staffs

SALVATION ARMY WORKERS OF SOUTH AFRICA AND SOME OF THEIR NATIVE ASSOCIATES

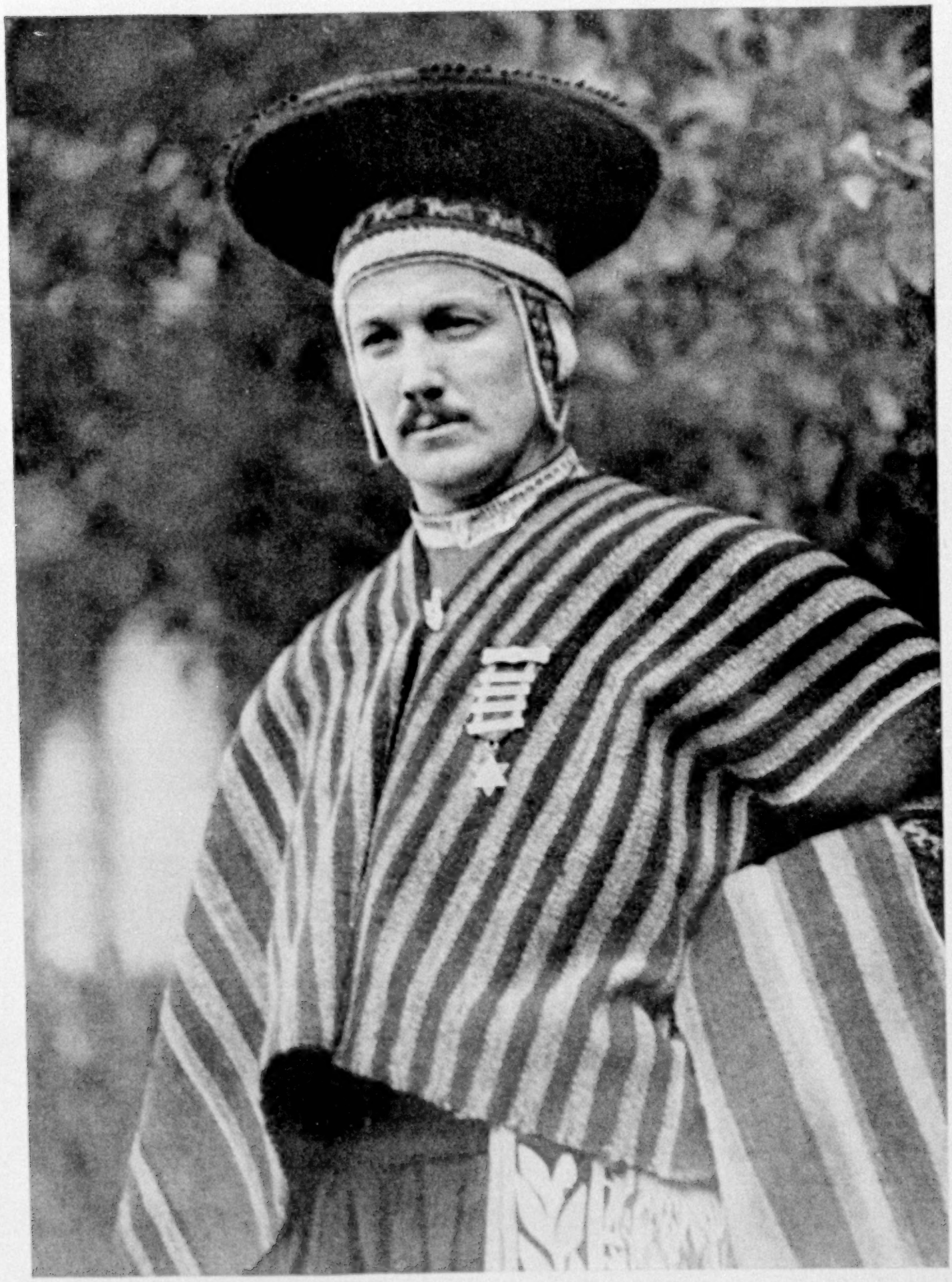
The South African field was entered by the Salvation Army more than thirty-seven years ago. The organization is now working in Zambesi, Rhodesia, and on the desolate island of St. Helena.

REVOLUTION AND STARVATION IN RUSSIA HAVE BEEN CLARION CALLS SUMMONING SALVATION ARMY WORKERS TO SERVICE

These refugees in Petrograd found among the Salvationists men and women "trained in the finest and most intricate of all arts, the art of dealing ably with human life."



A SALVATION ARMY JENNY LIND LEADING A STREET MEETING IN A SWEDISH CITY
No organization believes more strongly in the potency of song than the Salvation Army.



A SALVATION ARMY OFFICER OF PERU IN HIS PICTURESQUE UNIFORM
"Trained to obey orders willingly and gladly and wholly, not in part."

MEMBERS OF THE SALVATION ARMY IN SOUTH AMERICA WEAR RESPLENDENT REGALIA

But their service to their fellow-men is as simple, as earnest, and as self-sacrificing as is that of their brother workers in the slums of Shanghai and in the hills of Hindustan. The Salvation Army has been picturesquely described as a great empire—an empire without a frontier, an empire composed of fragments separated by vast stretches of land and immense sweeps of sea, but all bound together by the common cause of service to mankind.

and horns and their yodels, mingling their songs with the Germans, French, Italians, Scandinavians, South Americans, Canadians, Britishers, and 850 Americans.

Delegates were in that hall who came from Celebes, Sumatra, Costa Rica, Argentina, Cuba, Malta, Uruguay, Panama, Chile, Peru, Saint Lucia, Finland, and Antigua.

Out of this great mass of humanity our beloved General called to the front six little girls from the Criminal Tribes of India. They made a pathetic picture, with their little feet and legs bare, their slender forms wrapped in pieces of yellow cotton. As they stood before that vast audience they lifted up their dusky little faces and told the reason for it all in the song which they sang in broken English:

"Tell it again, tell it again,
Salvation's story repeat o'er and o'er,
Till none can say of the children of men,
Nobody ever has told it before."

WHEN THE FATHER OF WATERS GOES ON A RAMPAGE

An Account of the Salvaging of Food-fishes from the Overflowed Lands of the Mississippi River

By Hugh M. Smith

United States Commissioner of Fisheries

Photographs from the Bureau of Fisheries

ONE of the most important of the varied functions of the United States Bureau of Fisheries is a mighty effort to undo one of Nature's apparent blunders and mitigate the damage done annually to the prospective food supply of the country by a cataclysm involving untold millions of the best fishes in the Mississippi River and its tributaries.

This effort, yielding large practical results and coming at a period when there is most urgent demand for the prevention of waste and the maintenance of resources, must be rated as of great public importance and as worthy of general recognition and support.

The Father of Waters is a serious offender against the host of food and game fishes which populate its turbulent course, and exhibits marked disregard for the welfare of the entire fish tribe. Every year, and several times a year, it overflows its banks, wanders far from its proper haunts, and then subsides, leaving behind temporary pools, ponds, and lakes in which are myriads of young fishes whose destruction is inevitable unless human agency comes to their aid. Inasmuch as these fishes represent a large part of the future adult supply of all the leading species, their rescue and return to the main stream is a matter of the utmost importance.

For many years there has been a realization of this stupendous annual waste of food-fishes, and steps have been taken to repair some of that waste. It was only recently, however, that the efforts bore an adequate ratio to the magnitude of the task, and it was not until 1919 that the operations assumed a scope and yielded results that could be regarded as fairly commensurate with the need.

The annual freshet in the Mississippi River of greatest importance to the fisheries is the one known as the "June rise," which usually occurs about the time when most of the river fishes are ready to spawn. It is somewhat later than the freshet caused by the melting snows, but is usually of equal volume and represents surplus rainfall that is seeking a southern outlet.

PREHISTORIC GLACIERS CUT A WIDE VALLEY

In prehistoric times great glaciers, moving down from the north, seem to have cut a wide, deep valley through the upper reaches of the river, and through this passage frequent floods have for ages brought down and deposited silt and drift in such quantities that the main channel has been crowded from the center toward one of the precipitous banks on either side, while the remainder of what formerly constituted the river bed is now a low table-land, with a gradual ascent toward the hills.

It would appear that at one time the main river flowed unhindered through what is now wooded, lake-covered territory, and that great drifts gradually formed and divided the old bed into land-locked ponds, many parts of it with the lapse of time becoming so completely filled in as to provide secure anchorage for trees and other vegetation.

As the river rises it first submerges the adjacent lowlands, making ponds and lakes on the nearest levels; with its continued rise, lakes are formed at higher levels, and so on until the flood stage has

A TYPICAL FISH-RESCUE SCENE

Although this little bayou is still connected with the river by a shallow outlet, the rapid subsidence of the flood water would make it impossible for any of its fish inhabitants to escape into the river.

XUM

END OF A SEINE HAUL ON THE SHORE OF LARGE LAKE

The seine has been brought to shore and bunted, and the fish are being rounded up preparatory to sorting. Fish saved by this method can be transplanted in favorable waters for about one-thirtieth what it costs to rear the same fish in a pond-culture station.

SEINING UNDER THIN ICE

This is one of the most difficult operations in fish-rescue work, as small particles of ice become mixed with the fish. The rescue parties break the ice around the margin of the pond in order that the seine may be hauled under the frozen surface.

been reached, when depressions are often filled quite remote from the main channel.

Pursuing their natural instincts, the adult fishes at flood time leave the main channel and seek quiet back-waters in which to deposit their eggs. The eggs are laid under conditions that appear to be favorable for their development and for the hatching and growth of the young, and the latter may attain a length of several inches before the freshet begins to subside. With the recession of the flood waters, the adults turn their noses in the direction of safety and most of them ultimately reach the main stream. The young, however, fail to react promptly to the falling waters, and a very large proportion of them sooner or later are cut off and become permanently landlocked.

The temporary pools, ponds, lakes, and canals left by the subsiding flood waters are of various shapes, sizes, and depths. Some of them become dry in a few days; others may persist for weeks or months, while their water is gradually lost by evaporation and seepage; others, in smaller number, continue until winter, when they soon become solidly frozen.

YOUNG FISHES DOOMED TO DIE

The larger pools that survive the summer are often rich feeding grounds for the young fish, which grow with such amazing rapidity that many of them may attain a length of 8 to 10 inches by early November.

In any event, the fish contained in the landlocked waters necessarily die. The mortality may ensue quickly, as when a small pool becomes completely dry in a few days, or it may be gradual and long drawn out, as in a pond or lake of some acres area.

The frightful conditions that prevail as the water becomes reduced and the fishes more and more concentrated can well be imagined. The fishes' suffering from lack of water and air is usually aggravated by starvation, by the daily heating of the water by the sun's rays to a point that is almost intolerable and often fatal, by cannibalism, and by wading birds, snakes, turtles, mammals, and other fish-eating creatures from which there is no escape. The pools that persist until winter are so shallow that the fishes are killed by smothering, even if the water does not freeze to the bottom.

HOW THE FISHES ARE RESCUED

The work of salvaging food-fishes is simple, direct, and effective. It consists of netting the fishes from their unfavorable environment and depositing them in the open water of the Mississippi, and is accomplished by properly equipped rescue parties dispatched to the flooded districts from conveniently located bases or headquarters.

A government fish rescue crew consists of six to eight men, who employ a small launch in going to their field of operations and in returning to their base. The necessary equipment comprises fine-mesh seines of various lengths, small dip-nets, galvanized iron washtubs of one-and-a-half bushels capacity, tin dippers, and a flat-bottom rowboat.

The seining crews begin their work each season as soon as the floods subside sufficiently to disclose conditions. The active operations, as a rule, begin in July and continue in a given section until the allotted task is accomplished or the waters freeze, usually early in December.

The size and depth of given waters determine whether the men shall set their seines by wading or from a boat. As the net is carefully hauled and bunted, the fish are sorted into tubs, then carried as soon as practicable to the nearest point at which open water may be reached and there liberated.

The cut-off waters are for the most part in the bottom lands on both banks, usually within a few hundred yards of the river. In some sections, however, where the surface configuration permits a wide lateral dispersal of the flood waters, the temporary ponds that demand attention may be several miles back. It therefore happens that, while under ordinary circumstances the seining crew can easily carry the tubs of fish to the place of deposit, sometimes teams and motor trucks are employed.

Some of the landlocked waters are veritable lakes in which many seine hauls may be required to secure all or most of the fishes; others are so small that they may be thoroughly fished with a single

IN THE LARGER AND DEEPER PONDS, WHERE WADING IS IMPOSSIBLE, THE RESCUE CREWS SET THEIR SEINES WITH FLAT-BOTTOMED BOATS

LOADING CANS OF RESCUED FISH ON A TRUCK FOR SHIPMENT; ONCE PROPERLY HARDENED, A "FINGERLING" IS USUALLY A GOOD TRAVELER

haul of a short seine; and others are so extensive at the time of the first visit that they may properly be left for future attention when their size shall have become reduced to a point where thorough seining is possible.

156,657,000 FOOD-FISHES WERE RESCUED LAST SEASON

It may not appear to be a matter of great practical importance to know how many fishes of the different species are saved in the course of a season's work, but it is at least a matter of considerable interest to have such a record for each of the various sections of the river and for a series of years. Accordingly, the seining parties are under orders to make a count of the number of each species taken from each body of water.

The counting is done at the time the fish are lifted from the seines into the tubs with dip-nets. The tubs are half-filled with pure water, and fish of given sizes and species are counted into the tubs until the water level rises to a ring six inches below the top.

Subsequently, actual counting may not be necessary, but the number may be determined with sufficient accuracy by noting the water displacement. Frequent test countings are made in the course of the season, and a definite ratio of number to bulk is established for each average size of fish and each species.

When the weather is warm or the distance to the planting place is considerable, the welfare of the fishes densely crowded in the tubs requires that the water be kept well aërated. This is accomplished by dipping up a little water at a time and letting it fall back from a height of several feet, and is always aided by the squirming of the mass of fish, which keeps the surface water agitated and often frothy. Under the care of the vigilant and skilled fish men, the mortality among the rescued waifs while in transit is negligible, and when released the fish are healthy and active.

Throughout the entire length of the Mississippi River, except where the banks are protected by levees or where bluffs occur in proximity to the shores, the annual floods leave temporary lakes, ponds, and pools that contain food-fishes whose salvage is demanded.

The territory covered by the government's rescue operations in 1919 extended from Minnesota and Wisconsin to Arkansas and Mississippi. The places that were headquarters for rescue parties were Homer, Minn.; La Crosse, Wis.; Bellevue and North McGregor, Iowa; Quincy and Cairo, Ill.; Clarksville and Canton, Mo.; and Friars Point, Miss.

The record-making efforts in 1919 resulted in the saving of about 156,657,000 food-fishes. All parts of the river are not equally productive and all sections were not covered with the same degree of thoroughness. The territory reached from the base stations in Minnesota, Wisconsin, and Iowa yielded by far the largest returns in rescued fishes. There the conditions are especially favorable for an enormous annual destruction, and the need for salvage work is most pressing.

All the major and many of the minor food-fishes of the river are represented on the lists of those saved. Predominating in numbers are the staple fishes, which support commercial fishing and contribute largely to the food supply of the region, notably the buffalo-fishes, carps, catfishes, pikes, crappies, sunfishes, and perches.

Among the rescued game fishes the large-mouth black bass holds an important position, and with it may be classed also the crappies, rock bass, white bass, and various other excellent fishes which, while taken for market, are much sought by anglers throughout the Mississippi Valley.

THE FOOD-FISHES SAVED ARE WORTH MILLIONS OF DOLLARS

The young fishes that are salvaged and replanted in the parent stream are of rapid growth. A few of them may attain marketable size in the year after their rescue, and all of them are likely to be available for human use in two or three years.

The most critical period in the life of fishes is during a few weeks immediately after hatching. For most of the fishes rescued the principal danger from natural enemies and physical catastrophes

XUM

CLEANING UP A SMALL POND

Just as millions of dollars of taxes are made up of the pennies collected on small purchases of soda water and movie tickets, so 156,657,000 fishes were rescued from landlocked ponds, many of them, like this one, little more than puddles after the waters subside. Thrift in such little things makes national wealth.

SEINING A SMALL POOL, POSSIBLY SIXTY FEET WIDE; FOUR MONTHS BEFORE IT COVERED ABOUT TWELVE ACRES

When visited by a rescue party in November the pond had seeped and evaporated until it was 14 inches deep, and was easily handled with a 25-foot seine. Ten kinds of fish, aggregating 150,000, were saved. (See NATIONAL GEOGRAPHIC MAGAZINE for June, 1916, page 572.)

WASHING A MUD-CLOGGED SEINE IN A SHALLOW BAYOU

Some of the landlocked pools and bayous have soft, muddy bottoms, and when the seine is hauled in, fish and mud are mingled in a dense mass. By lifting the lead line and moving the seine away from the shore, a gentle rocking motion of the net easily rids the seine of mud

has passed, the degree of safety depending largely on the size attained.

In the opinion of State and Federal fish culturists familiar with conditions in the Mississippi Valley and experienced in the rearing of the local fishes, at least 25 per cent of the fishes rescued may be expected to survive to a marketable or legal size, and will reach an average weight of not less than one and a half pounds in two or three years. Assuming that all the surviving fishes will then be caught for market and sold by the fishermen at the prices prevailing for the respective species in the local markets in December, 1919, the fishes salvaged by the Bureau in 1919 are estimated to have a prospective value of $6,527,000.

THE COST OF THE WORK IS SURPRISINGLY SMALL

The fish-rescue work, however beneficial from the standpoint of fish conservation, would hardly be justified if the

SORTING AND COUNTING A SMALL SEINE HAUL

It is a matter of interest to know the relative abundance of the different kinds of food-fishes in different parts of the Mississippi Valley and to be able to determine the unit cost of operations. In 1919 the actual outlay for saving this valuable food supply was about 1/50 of a cent per fish.

expense were disproportionate to the value of the results. It is therefore proper to note that the unit cost is only nominal, and even the total money outlay for operations of the magnitude of those in 1919 is surprisingly small.

Five years ago, when this work was undertaken on a limited scale and involved the salvaging of less than 2,500,000 fishes, the average cost per thousand fish saved was $3.18. In 1919, owing partly to the magnitude of the operations and partly to increased efficiency and better organization, the average cost per thousand was reduced to less than 20 cents. The cost in some of the less productive fields, where fixed overhead charges were applied to a comparatively small output, was somewhat higher, but 75 to 80 per cent of the fish were rescued and replanted at a cost of only 13 cents per thousand.

PLANTING RESCUED FISHES IN THE RIVER

At least one-fourth of the fishes rescued may be expected to survive to a marketable or legal size, and will reach an average weight of not less than one and a half pounds in two or three years.

IN A MISSISSIPPI RIVER JUNGLE

A government fishing crew going through a dense section of Mississippi River bottom land with their tubs full of rescued fishes, to be planted as soon as the river is reached. Only six of these rescued fish in a thousand are planted outside of the Mississippi basin.

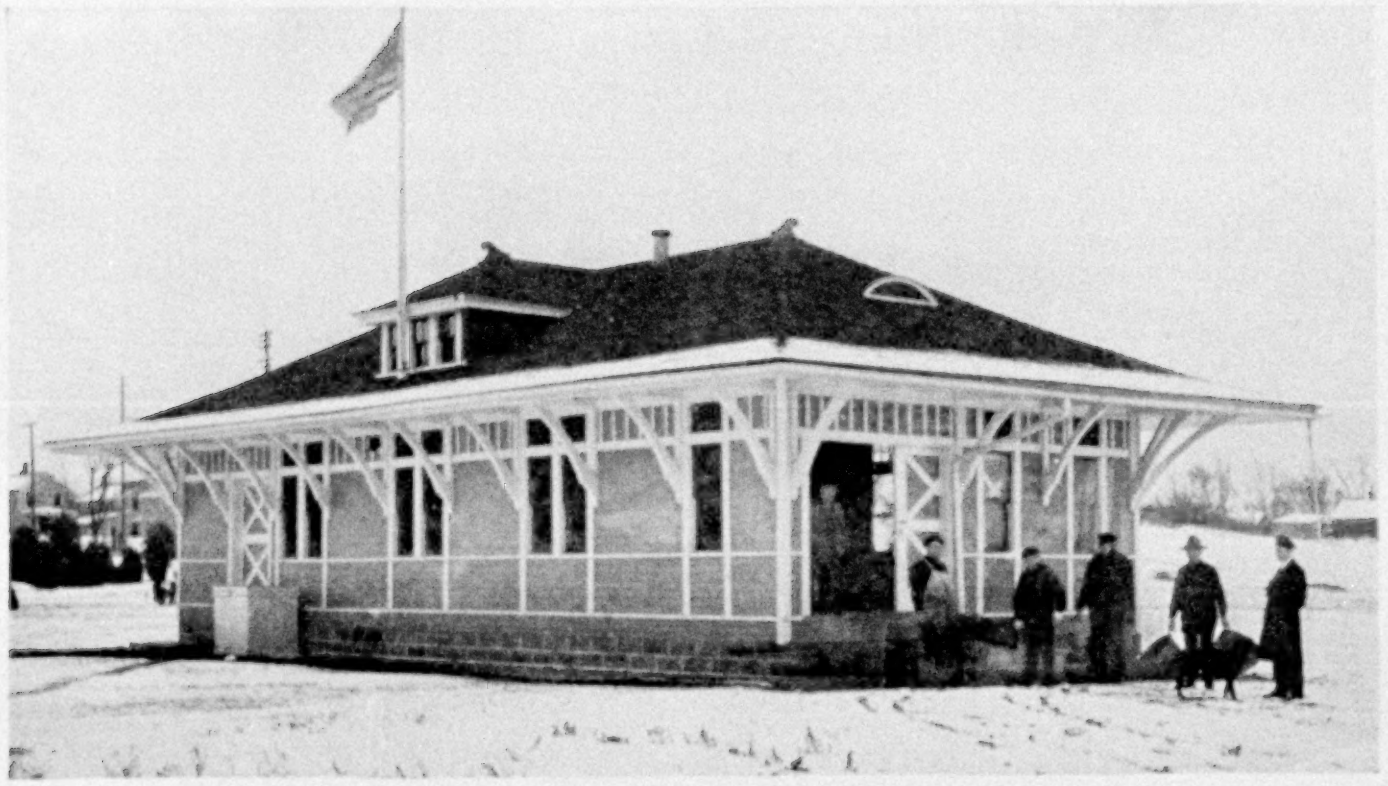
A SEINING CREW ON THE MARCH

The party is proceeding in late autumn between two isolated lakes in a wooded bottom. In summer the small ditch was full of water and the lakes were connected with the river. The crew is here seen hauling a small boat from one lake to another.

Throughout the Mississippi Valley—in the States of Minnesota, Iowa, Kentucky, Tennessee, Missouri, Arkansas, and Mississippi—as well as in various other States, there are Federal establishments known as pond-culture stations, at which are reared some of the same fishes that are rescued in the salvage operations along the river, the principal species handled being the black basses, crappies, sunfishes, and catfishes.

The peculiarity which distinguishes these stations from the ordinary hatcheries is that the ripe eggs are not taken from the fishes by the fish-culturist, as in the case of trout, salmon, whitefish, shad, etc., but the fishes are allowed to spawn naturally.

Most of the pond fishes make nests and guard their eggs and young. It is therefore usually the case at these stations that a relatively large proportion



RETAINING STATION AT LA CROSSE, WISCONSIN

At this little adjunct of the rescue work, on the Mississippi River in southwestern Wisconsin, 150,000 salvaged fishes may be held for hardening, pending shipment to interior waters. When first rescued from landlocked waters the young fish cannot undergo the strain of a long railway journey.

of the progeny of a given pair of fishes is reared to a stage where the young are able to take fairly good care of themselves, although the actual number produced is small.

The results of the operation of pond stations are of interest because of their bearing on the value of the rescue work. It may therefore be noted that the common practice among both Federal and State fish-culturists is to distribute pond fishes after they have been reared to a "fingerling" size. A fingerling is less than one year old, and may be from one to six inches long when planted.

The average length of the pond fishes sent out from the nurseries is two to three inches. A government pond station may produce, rear, and plant from 250,000 to 1,000,000 such fishes in a season, and the combined output of six typical stations in 1919 may be placed at 2,725,000—a cost of $5.50 per thousand.

From these figures it appears that the number of fishes rescued in 1919, if they had been produced and reared in the ordinary way at established plants, would have required 345 pond stations and the actual cost of production would have been about $860,000. To this sum, however, should be added the year's cost of the regular station staffs and general charges for maintenance, which would have been over $2,000,000.

There should also be taken into consideration the initial cost of construction of the pond stations, estimated at not less than $12,000,000. Against these large hypothetical charges is to be placed the actual aggregate cost of the salvage operations in 1919, namely, $31,000.

THE PEARL BUTTON INDUSTRY EMPLOYS 20,000 PEOPLE

The perpetuation of the fish supply in the Mississippi and its tributaries involves a very important industry besides fishing. Investigations conducted for the Bureau of Fisheries years ago showed an intimate relation between certain kinds of fishes and the mussels, which yield valuable pearls and support a pearl-button industry which gives employment to about 20,000 persons and has a product worth from $5,000,000 to $6,000,000 annually.

The young mussels, of microscopic size when thrown off by their parents in

Photograph from H. C. Frankenfield

PART OF THE CAIRO, ILLINOIS, DRAINAGE DISTRICT UNDER FLOOD WATERS

The last thing that one would expect to rescue from a flood are the fishes, yet amid all this desolation there are those who are far-sighted enough to save landlocked fishes after man has saved what he can from his water-logged home.

myriads, need to pass the first few weeks of their independent existence on the gills of fishes. If the fishes are not present at the proper time, the mussels cannot survive. Furthermore—and this is a most interesting feature of the co-relation of fishes and mussels—the young of particular kinds of mussels require the gills of particular kinds of fishes as nurseries.

The black bass is host for several sorts of mussels, the crappies for several others, the catfishes for others. The skip-jack, a kind of herring, is the only known host for the best of all mussels; and as this fish is not by any means abundant, its maintenance is of prime importance to the welfare of the button industry. In 1919 more than one and a half million skip-jacks were rescued.

AN IMPROVEMENT ON NATURE

The peculiar requirements of the young mussels having been carefully determined, the Bureau of Fisheries has gone extensively into the business of artificial propagation of pearly mussels by a method which is a vast improvement on nature. The spawning mussels, held in ponds, are at the critical period provided with the special fishes needed for the attachment of the young. The fishes obtained in the rescue operations are turned into the ponds at the time the mussels are spawning and become thickly inoculated. They are then liberated in the open water and distribute themselves and the mussels throughout a wide stretch of river. Thus two important branches of the Bureau's work go hand in hand.

The artificial propagation of freshwater mussels is one of the functions of the United States Fisheries Biological Laboratory located on the Mississippi River near Fairport, Iowa. Each year from 200,000,000 to 300,000,000 young mussels are thus brought in contact with the gills of rescued fishes and given a proper start in life. The maintenance of the mussel supply is thus being greatly aided.

That this work is not a mere experiment, but is yielding practical results, is shown by various pieces of evidence. For instance, pearl buttons have been made from Mississippi River mussels grown from larvæ that had been artificially implanted on the gills of a black bass less than two years before and had been under constant observation. These mussels would have attained full commercial size at the age of four and a half years.

DISTRIBUTION OF FISHES TO OUTSIDE WATERS

This account of the rescue work would be incomplete if no reference were made to the sending of small numbers of salvaged fishes to waters more or less remote from the Mississippi. These fishes serve the same purpose as do the product of the hatcheries. They are intended for replenishing depleted waters or for stocking newly formed lakes and ponds that may have no fish life or no suitable supply of food or game fishes.

Fishes as taken from the landlocked waters of the Mississippi Valley are not in a condition to stand distant shipment. It is therefore necessary to subject them to a hardening process before it is safe or wise to send them on a long railway journey. The hardening is done at several depots along the river, notably at La Crosse, Wis., and Bellevue, Iowa. At these and several other points are small buildings containing tanks in which the fish are kept, without food, in cool, clear, running water for several days.

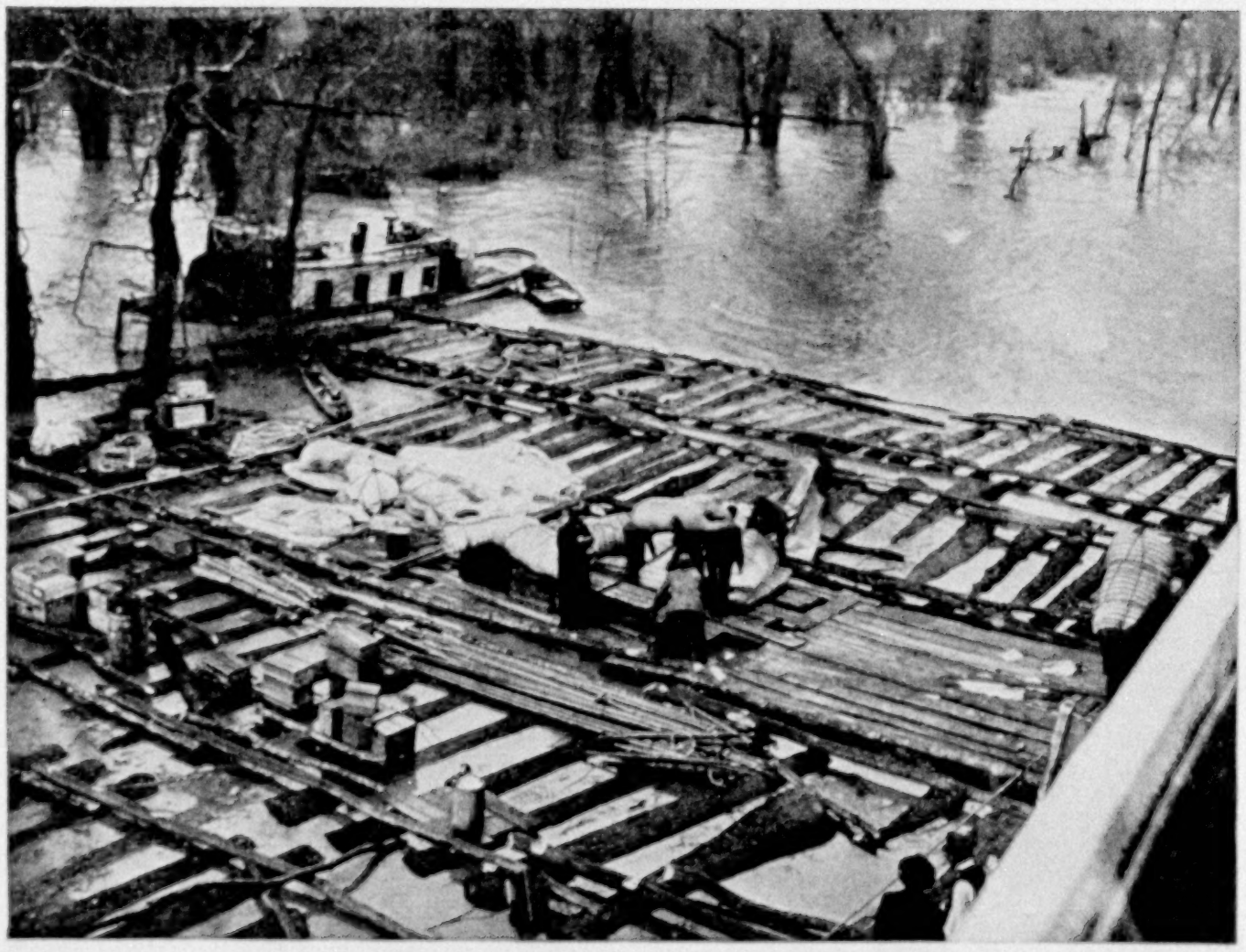
The fish, then ready for shipment, are placed in large cans and loaded into railway cars, in which they make their journey in safety and comfort. Minor shipments for short distances may be made in baggage cars, with an attendant.

The new all-steel distributing cars of the Bureau of Fisheries embody the very latest ideas in fish transportation. These cars, with their permanent crews and with all modern improvements for keeping fish supplied with water and air, are hauled on fast passenger trains and have been used for forwarding from the Mississippi the special lots of rescued fishes designed for planting in adjoining States.

Sometimes a car-load of fish may be taken in its entirety to a single point of deposit, but more frequently detachments are delivered *en route* to applicants who have been notified in advance, by mail or telegraph, to meet a given train with receptacles for taking their fish away.

A BROKEN MISSISSIPPI RIVER LEVEE AT LUCCA, ARKANSAS

Not only Holland and the Acadian home of Evangeline have protected themselves by dikes, but scores of the great rivers of the world are paralleled by earthen or stone embankments.



Photograph from H. C. Frankenfield

REFUGEES ON LOG RAFT AT NEBLETT, MISSISSIPPI, WAITING FOR A STEAMER

Face to face with a common peril, the people of the flooded districts unite in building log rafts that, with the arrival of more refugees, come to have as many necessaries and such luxuries as the Swiss Family Robinson salvaged from the wreck.

Photograph from H. C. Frankenfield

FAMILY ARKS IN WHICH REFUGEES FROM A MISSISSIPPI RIVER FLOOD SEEK SAFETY AFTER THE DESTRUCTION OF THEIR HOME: MODOC, ARKANSAS

Lest there may be created the impression that large numbers of salvaged fishes that should be returned to the parent stream are being diverted to outside waters, it may be stated that in 1919 less than six-tenths of 1 per cent of the fishes saved from the Mississippi floods were consigned to outside waters. This altogether negligible number consisted chiefly of catfishes, sunfishes, crappies, and basses.

From what has already been stated, it must be apparent that this work on which the fisheries service of the Federal Government has voluntarily embarked is of very great value, not only to the States immediately concerned, but also to distant parts of the country, for the food-fishes of the Mississippi basin receive a wide distribution in the trade. As a matter of fact, the importance of this effort as a means of maintaining and increasing the food supply of the country can hardly be equaled in any other field when cost, certain results, and quick returns are taken into consideration.

In most of the States bordering on the Mississippi there is a growing public interest in and urgent demand for a continuation and extension of the rescue work; and along the Ohio, Missouri, and other tributaries of the Mississippi,

Photograph from H. C. Frankenfield

REFUGEES ON A MOUND AT MODOC, ARKANSAS, JUST BELOW THE SCENE OF A CREVASSE IN GARDINER'S LEVEE ANGLE

where there prevail essentially the same conditions as in the main stream, the desirability of this form of food conservation is being seriously considered.

In the districts now only partly covered and in the sections where up to this time it has been impossible to undertake any operations, there exists an opportunity for very productive work. There are unbroken stretches of river 500 miles in length, where the floods are yearly causing large sacrifice of food-fishes, on which no attempts at rescue have heretofore been made because of lack of funds and personnel, and the major tributaries of the Mississippi present a virgin field of unknown possibilities.

It should be understood that Congress does not appropriate funds especially for this particular work, and that the money now employed is in reality part of a general appropriation for fish culture, and the persons and equipment detailed for the rescue operations are temporarily drawn from other branches of the service.

What is needed, in order that this service may be conducted in a manner and on a scale that its importance justifies, is specific recognition by Congress through the providing of special funds and personnel, so that the work may not be contingent on the necessities of other duly established activities.

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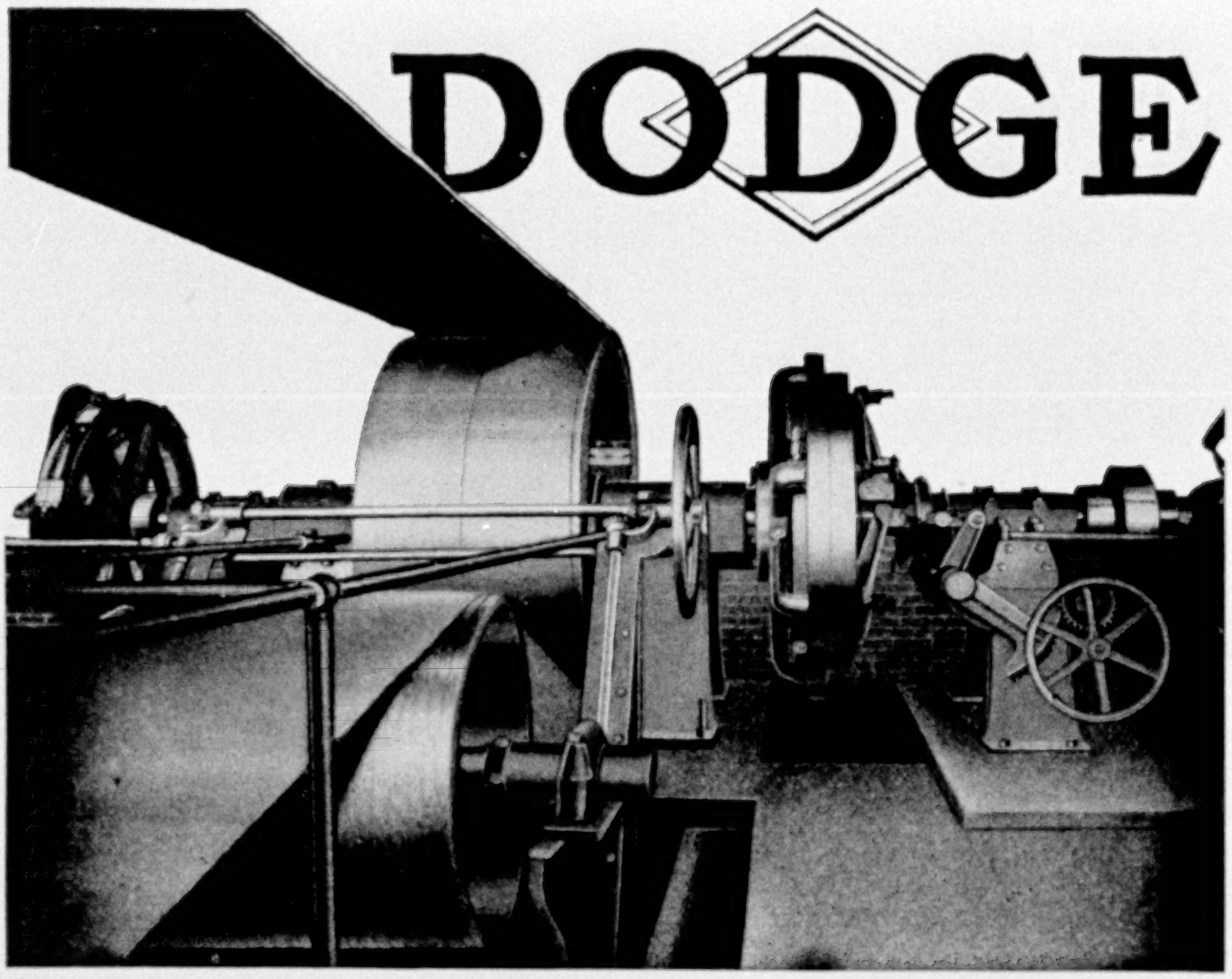

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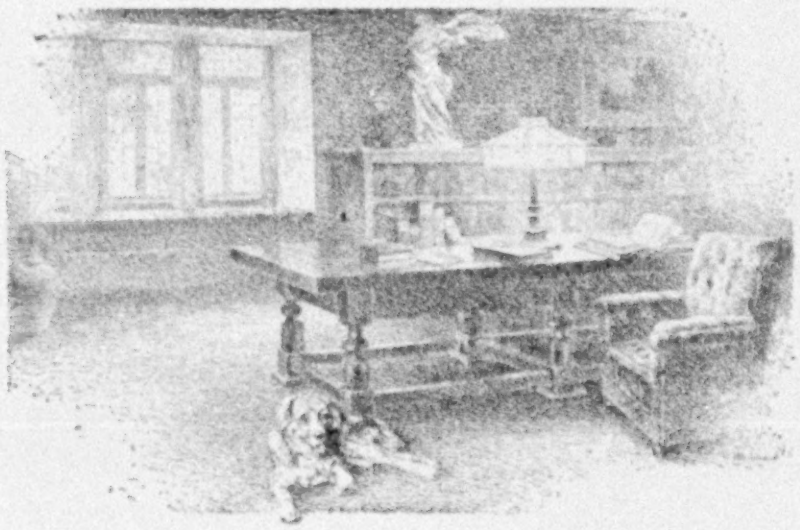

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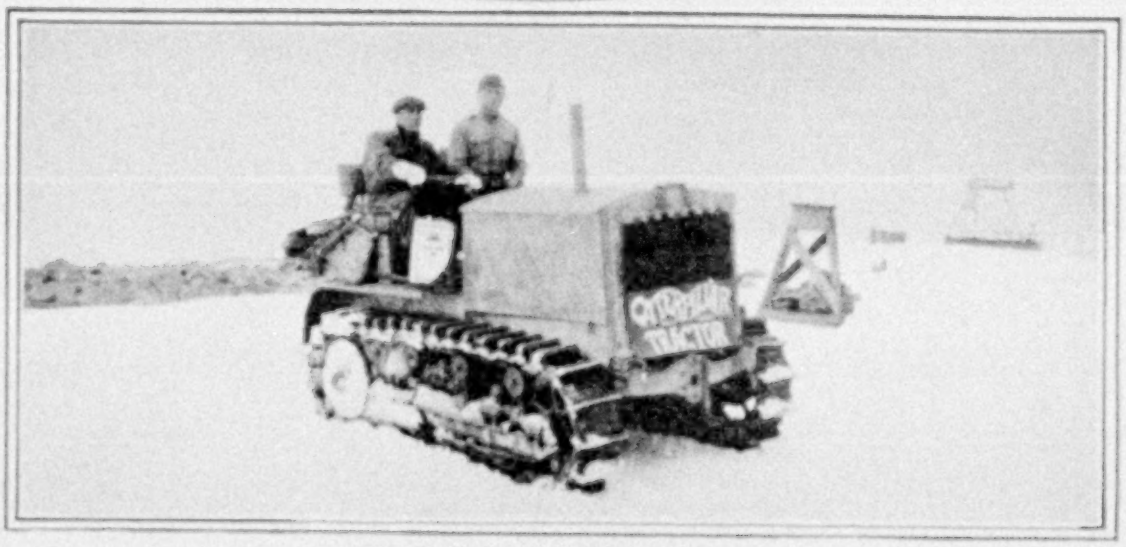

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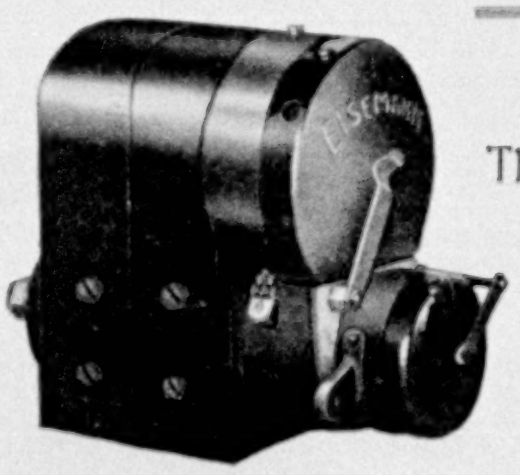

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We ask you to write for a free 10-day Tube and learn what it means to your teeth.

Watch It Disappear

Get this free tube of Pepsodent and use like any tooth paste. Note how clean the teeth feel after using. Mark the absence of the slimy film. See how the teeth whiten as the fixed film disappears. You will know in a few days what clean teeth mean.

Pepsodent is based on pepsin, the digestant of albumin. The film is albuminous matter. The object of Pepsodent is to dissolve it, then to constantly combat it.

The way seems simple but for long it seemed impossible. Pepsin must be activated, and the usual method is an acid harmful to the teeth.

Then the invention of a harmless activating method made this application possible. And it seems to solve the problem of this tooth-destroying film.

Pepsodent has been proved under able authorities by many clinical tests. Leading dentists all over America have come to endorse and adopt it. Now we urge you to try it.

Pepsodent PAT. OFF. REG. U. S.

The New-Day Dentifrice

Now advised by leading dentists. Druggists everywhere are supplied with large tubes

---

Send the Coupon for a 10-Day Tube

Note how clean the teeth feel after using. Mark the absence of the slimy film. See how the teeth whiten as the fixed film disappears.

Compare the results with the methods you now use. Judge for yourself which best protects the teeth. Do this for your sake and your children's sake. Cut out the coupon now.

(223)

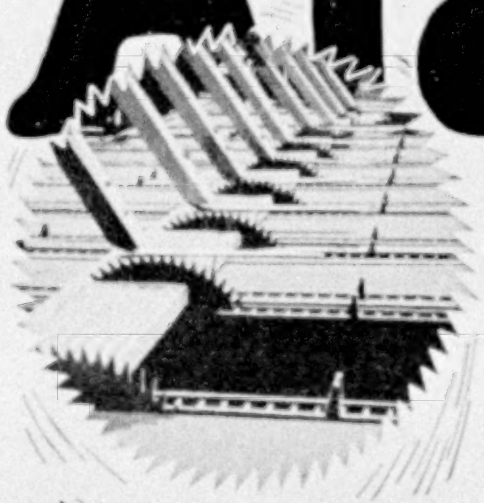
Ten-Day Tube Free

THE PEPSODENT COMPANY,
Dept. 181, 1104 S. Wabash Ave., Chicago, Ill.:
Mail 10-Day Tube of Pepsodent to

Name .....

Address .....

Aladdin



Readi-Cut Homes

Cut Building Costs

The System

$100 MINUS LABOR WASTE

$70

Save the Waste and Reduce the Cost

The Aladdin System Scientifically Prepares the Materials and Conserves the Labor. You Can Save 18% of the Lumber and 30% on the Cost of the Labor

$100 MINUS LUMBER WASTE

$82

Certified records of thousands of Aladdin Homebuilders in every State prove these statements. You can prove these statements for yourself, for there is an Aladdin Home near you wherever you live.

The pictures above tell the story of scientific preparation and handling of materials and the efficient conservation and direction of labor. The Lumber that's Wasted Costs Just as Much as the Lumber that's Used. The only possible way to reduce present high prices of lumber and labor is to save the usual waste. The Aladdin System prepares all the lumber in our mills ready to be nailed in place. Waste of lumber is reduced to less than 2%.

Greatest Distributing System of Lumber in the World

Aladdin houses are manufactured and shipped direct from the Aladdin Company's own Mills in Michigan, Mississippi, North Carolina, and Oregon. Wherever you live Aladdin Houses come to you in a straight line from the nearest timber region.

Aladdin's National Homebuilding Service means shorter routes, quicker delivery, and lower freight rates for builders in every part of the United States. Complete Sales and Business offices are maintained in connection with each mill.

Aladdin Readi-Cut Houses Include All Material Cut-to-Fit Complete

The Aladdin Book of Homes has a message for you. Amongst its pages, profusely illustrated in colors, leading home designs are represented to you. Aladdin houses are cut-to-fit as follows: Lumber, millwork, flooring, outside and inside finish, doors, windows, shingles, lath and plaster, hardware, locks, nails, paint, varnishes. The material is shipped to you in a sealed box-car, complete. Send today for a copy of "Aladdin Homes" No. 905.

The Result

First Day's Work

Noon, Third Day

Seventh Day

Twentieth Day

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ALADDIN Branches Wilmington, North Carolina. Portland, Oregon. Hattiesburg, Mississippi. Toronto, Ontario, Canada.

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GMC Trucks are built and backed by the exclusive truck-building unit of the General Motors Corporation.

GENERAL MOTORS TRUCK COMPANY

One of the Units of the General Motors Corporation

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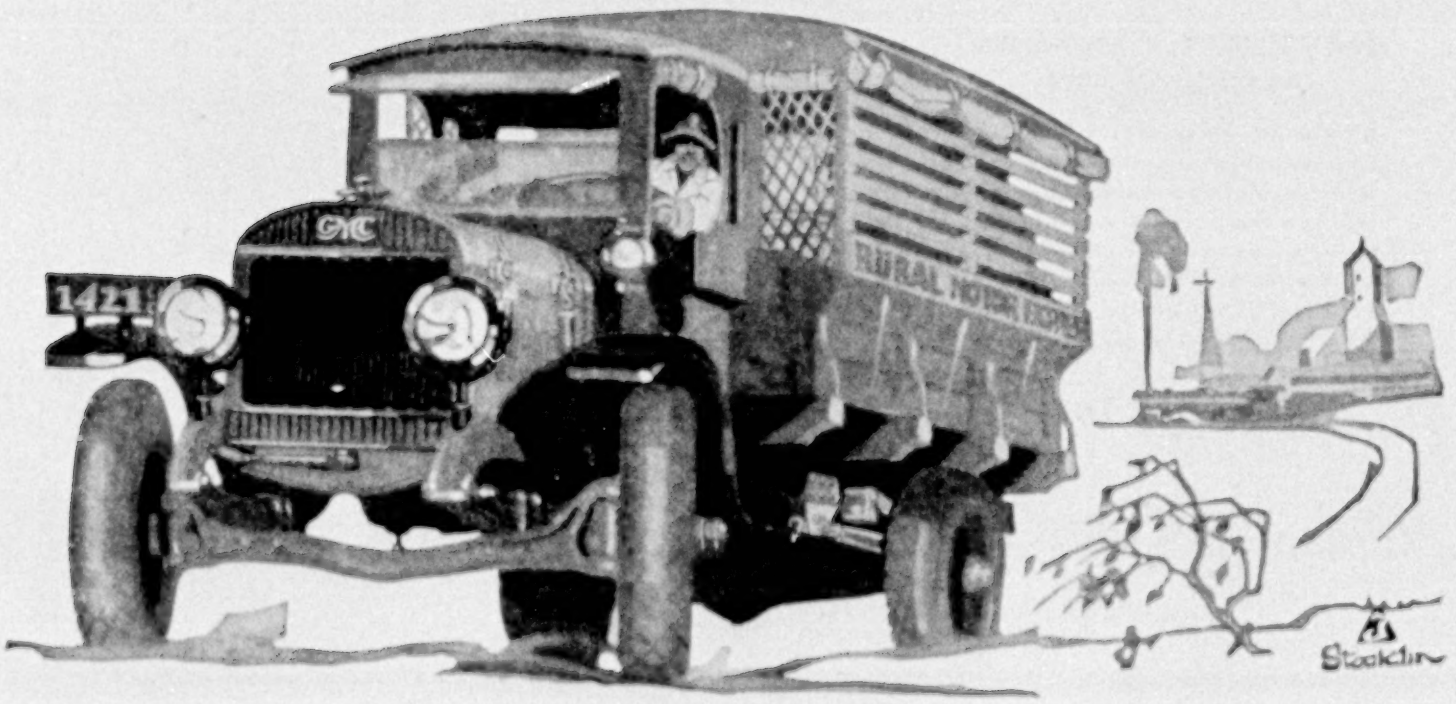
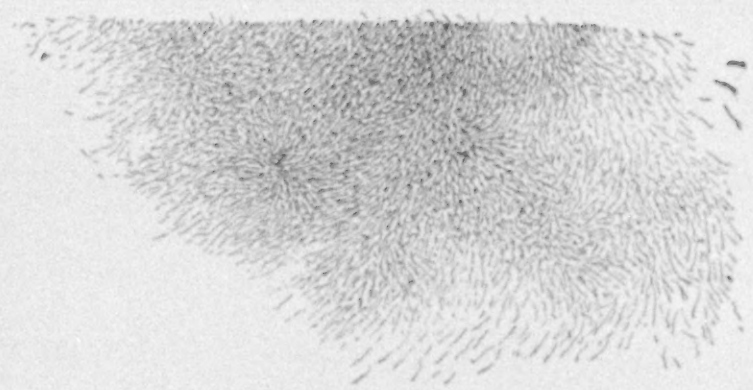


"Mention The Geographic—It identifies you"

How Canned Food will help a Woman with Her Greatest Problem



NATIONAL CANNERS ASSOCIATION

A nation-wide organization formed in 1907, consisting of producers of all varieties of hermetically sealed canned foods which have been sterilized by heat. It neither produces, buys, nor sells. Its purpose is to assure, for the mutual benefit of the industry and the public, the best canned foods that scientific knowledge and human skill can produce.

Washington, D. C.

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Three Meals a Day - a Thousand a Year

DO you feel like "just giving up" sometimes when trying to tempt the appetites of that family of yours?

Haven't you stood in the middle of your kitchen or pantry many a time, wondering what you would "get" for the next meal?

But suppose that the next time you look around your pantry for inspiration you discover a variety of canned foods on the shelves—*real* foods that give you surprising suggestions for tempting meals!

Canned Food Variety Solves your Meal Problems

The variety of canned foods is wonderful, and the number of things that can be made with such foods is still more wonderful. You need not worry about variety to your meals if you are using canned foods as freely as you *can* use them.

You need not worry that meals won't look tempting, taste delicious, and satisfy fickle appetites.

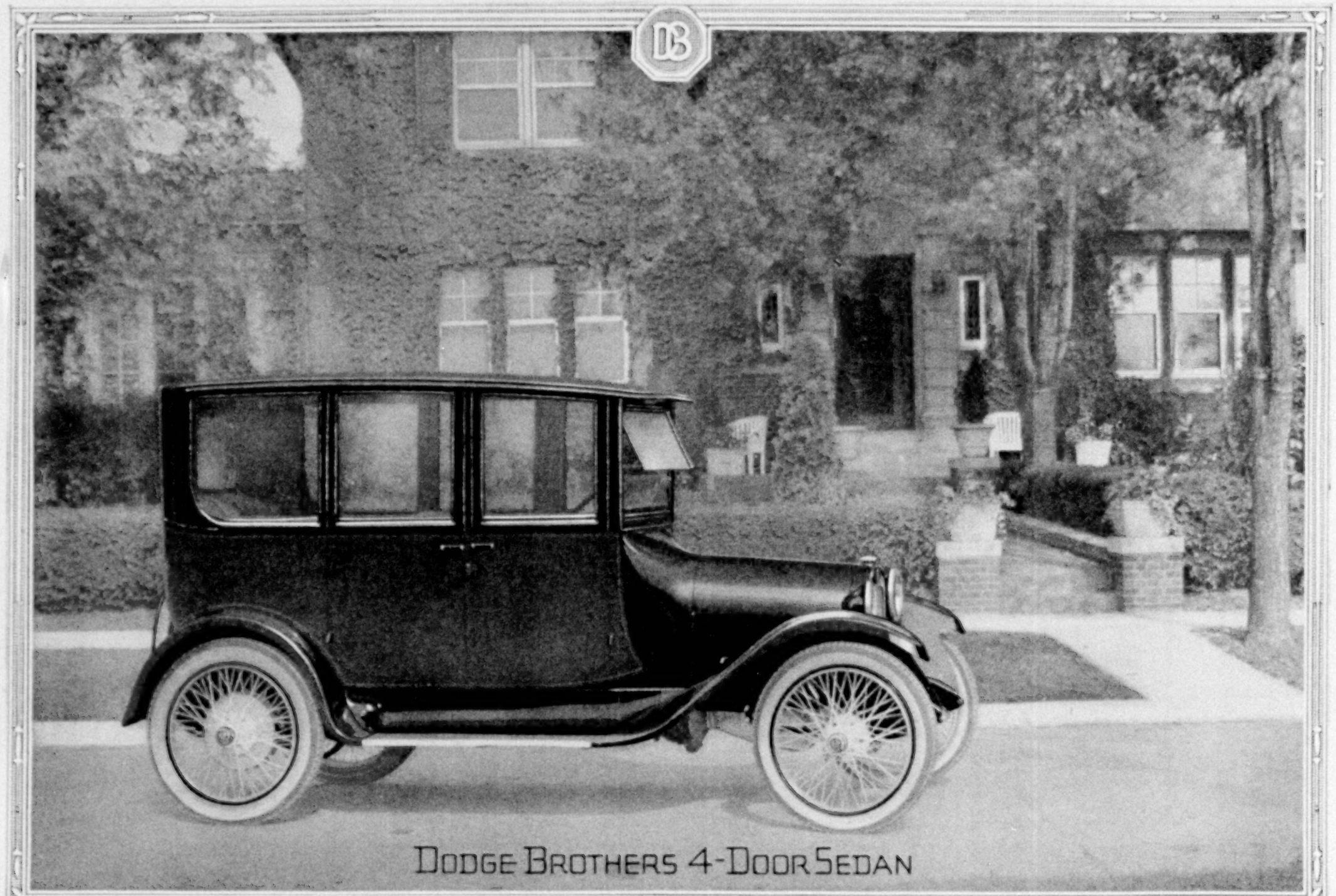
Greatest Allies a Woman can Have

With plenty of canned foods on hand in full variety of fruit, vegetables, fish, and meats, to say nothing of soups and milk, a woman is more resourceful than her family would have believed possible.

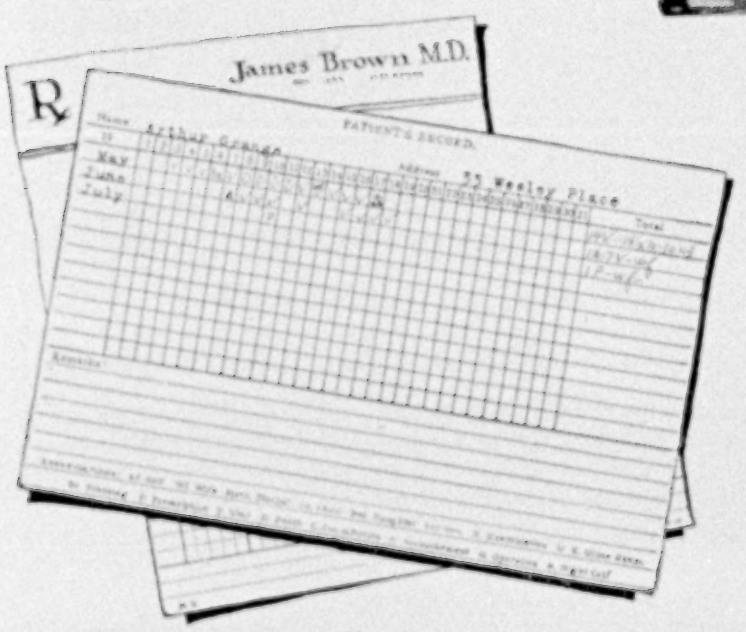
Many a Surprise in store for your Family

It is almost like travelling all over the country and eating the choice foods of each State of the Union when you use canned foods in all the variety of kinds and "dishes."

NATIONAL CANNERS ASSOCIATION
WASHINGTON, D. C.



DODGE BROTHERS 4-DOOR SEDAN



For doctors and druggists a label holder and medical keyboard are provided, thus adding special convenience to Corona's broad utility as a general writing machine.

And Not Only the Doctor—

ANY doctor using Corona—and there are many—will tell you how it facilitates his correspondence, billing and record keeping. Like other professional and business men who do not regularly employ typists, the doctor appreciates Corona's legible, accurate and orderly work—work that is a real source of satisfaction, though usually done in odd hours of his busy day or evening.

So, too, in thousands of homes, in small offices and stores, in warehouses, stockrooms, contractors' shacks, lumber and construction camps—wherever there is no stenographer, yet reliable service is demanded—Corona is daily proving its utility. In simplicity of operation, small size, compactness, ready portability and capacity for heavy duty, Corona grades 100%.

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$50
including carrying case

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Consult your telephone book for address of local Corona Agency

CORONA

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fold it up-take it with you-typewrite anywhere

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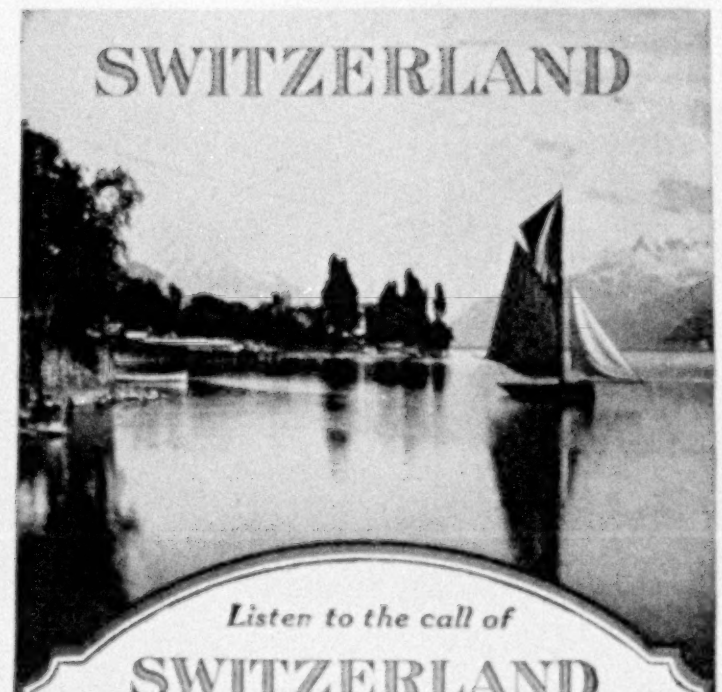

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Official Agency of the

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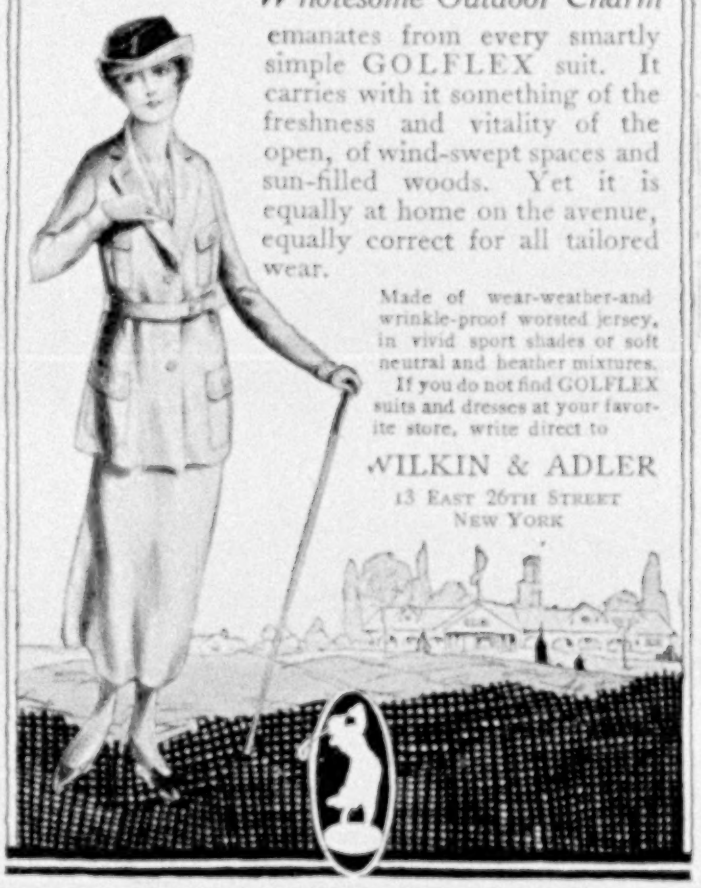
emanates from every smartly simple GOLFLEX suit. It carries with it something of the freshness and vitality of the open, of wind-swept spaces and sun-filled woods. Yet it is equally at home on the avenue, equally correct for all tailored wear.



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Address .....

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for membership in the Society

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4-20 *Name and Address of Nominating Member*

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Makers of Cashmere Bouquet Soap—luxurious, lasting, refined.

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Put Beauty Into Your Typing
As You Do In Your Thoughts--
Put as much force and
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do in your speech.
There's only <u>one</u> machine on
which you <u>can</u> do this - and
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"Many Typewriters in One!"

Over 365

Different Type-Sets, Including All Languages

Any one of which may be substituted in a few seconds: "Just turn the Knob"

The distinctive types available *only* on the *Multiplex* give to your writing the distinction and *emphasis* the inflection of your voice gives to your speech

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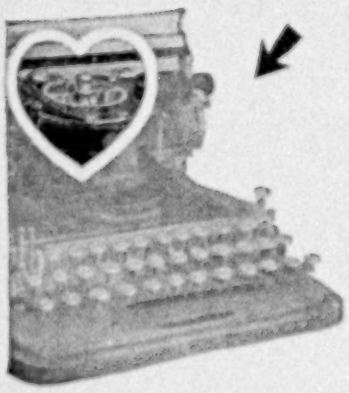

The Heart of The Hammond

Let us send you the free Folders which explain the 16 unique features of the Multiplex. They will prove *an education in writing machines* to you, and we are glad to send them to any interested reader of this publication

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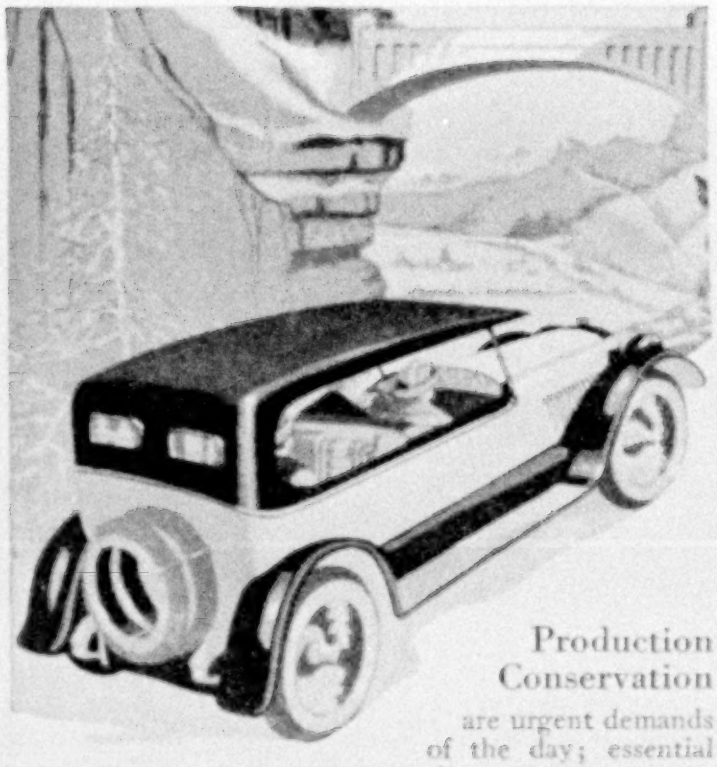

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are urgent demands of the day; essential during this period of post-war readjustment.

The New Stromberg Carburetor meets both—increases production of power, of speed and of mileage, conserves fuel and fuel costs. Effects the greatest of economy through development of greatest fuel *force*, insuring a decided improvement in engine efficiency—an important increase in driving power and radical reduction in travel costs. Write for literature. State name, year and model of your machine.

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THERE will not be a particle of soot or dust on your daintiest dresses, however long and dirty the trip, if your trunk is a Mendel Dustproof. It is the choice of the people who know—everywhere.

Mendel-Drucker Trunks are made in steamer, wardrobe, dress, hat types and in all grades. Write for booklet and name of nearest dealer.

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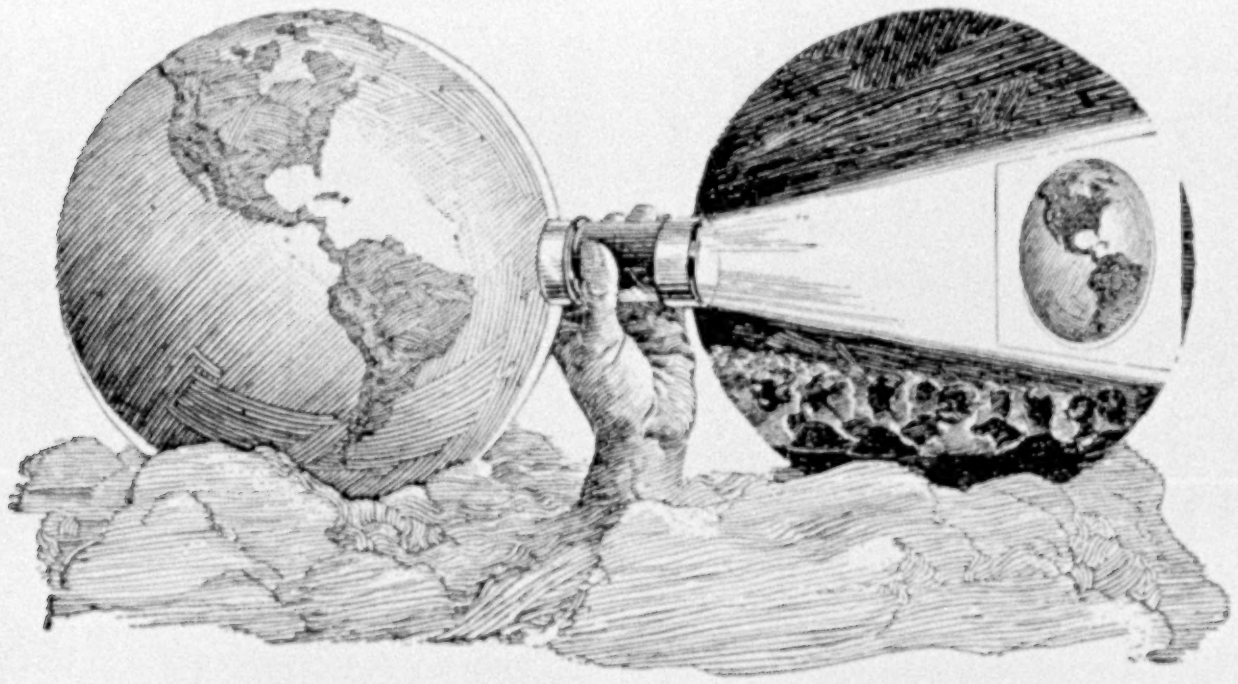

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THE motion picture and the stereopticon—made possible by lenses! Lenses to record history or story, lenses to project them! Approximately 120,000,000 feet of film shown by them daily to millions of people in America's theatres!

And through lenses we are whisked o'er the seven seas — into dreamlands and real lands — into the midst of raging battle, or into the peaceful love of a childish paradise.

And through lenses are flashed upon the screen; the miracles of growing plant life and the secrets of the microscope, made still larger that all may see.

All the strange, new worlds within worlds—the worlds of industry, of medicine, of fiction, of love, of war, of truth—all these are brought to all the people, because there are lenses—those bits of marvel glass, marvelously ground —that do weird things with light.

That this institution has been the leader in lens and other optical development since the middle of the last century, is our incentive to maintain that leadership, and do even more, "that eyes may see better and farther."

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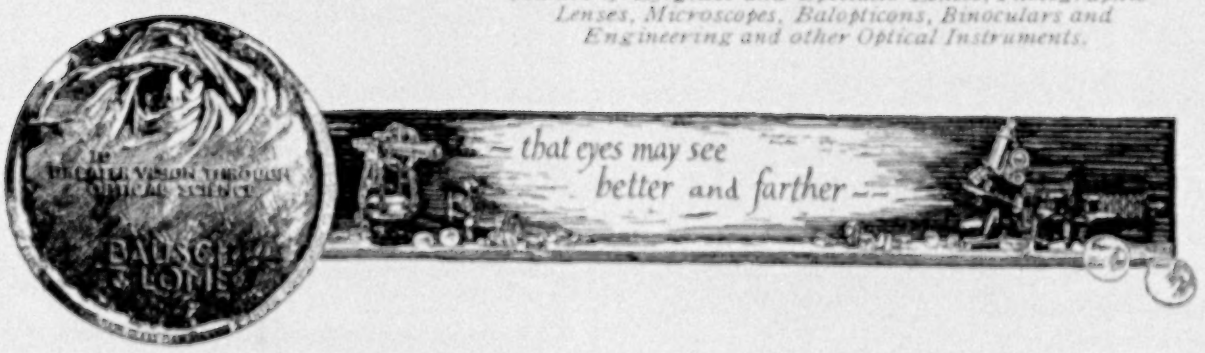

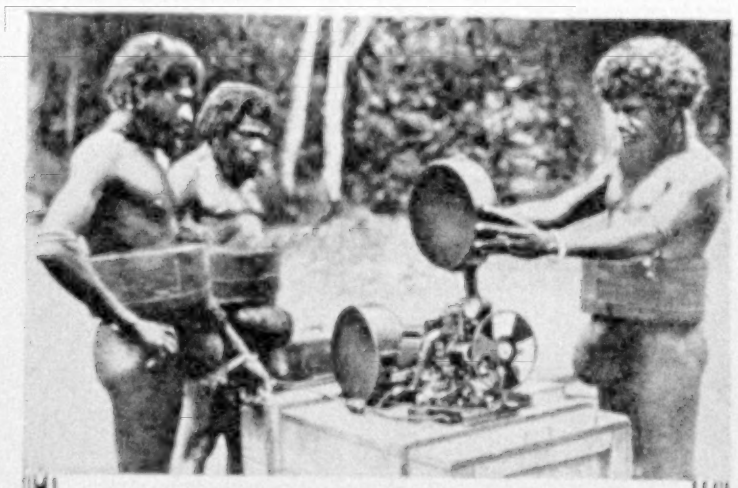

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that bleed easily are the first symptoms of pyorrhea. Loss of teeth may follow if these conditions are not corrected.

Pyorrhocide Powder is the only dentifrice whose value in treating and preventing pyorrhea has been proved by dental clinics devoted exclusively to this phase of oral prophylaxis. Pyorrhocide Powder's specific purpose is to restore and maintain gum health. It cleans and polishes the teeth. Scientifically compounded for these purposes, dentists everywhere prescribe it.

Take prompt action to restore and then maintain gum health. Use Pyorrhocide Powder daily.

Pyorrhocide Powder is economical because a dollar package contains six months' supply. Sold by leading druggists and dental supply houses.

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Write for free sample and our booklet on Prevention and Treatment of Pyorrhea.

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We shall continue to offer through exhaustive scientific research, and by unlimited clinical facilities, only such a dentifrice as is proved most effective—in promoting tooth, gum, and mouth health.

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THE EIGHT WITH EIGHTY LESS PARTS

CREATIVE GENIUS

CREATIVE genius, whether it builds cathedrals or motor cars, is never satisfied, never at the end of its endeavor. Year by year the creative genius of Apperson Brothers has enriched the motor car industry, mechanically and artistically.

Creative genius made them the trail-blazers with the first side-door car; first double opposed motor; first float-feed carburetor; first electric ignition. The marvelous Apperson motor of today, simplified with eighty less parts, is the culmination of Apperson creative genius.

As a result Apperson rushes from one mile an hour to 40 miles in high in 20 seconds; brakes to a dead stop from 40 miles in 4 seconds; turns on 130-inch wheel base in a 38¼-foot circle.

The surface beauty of the Apperson is apparent to every beholder, but the beauty of its performance must be experienced by personal contact. Drive an Apperson first—then decide.

Dynamic America Demands Results
Apperson Produces Them

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Kokomo Indiana

Export Department
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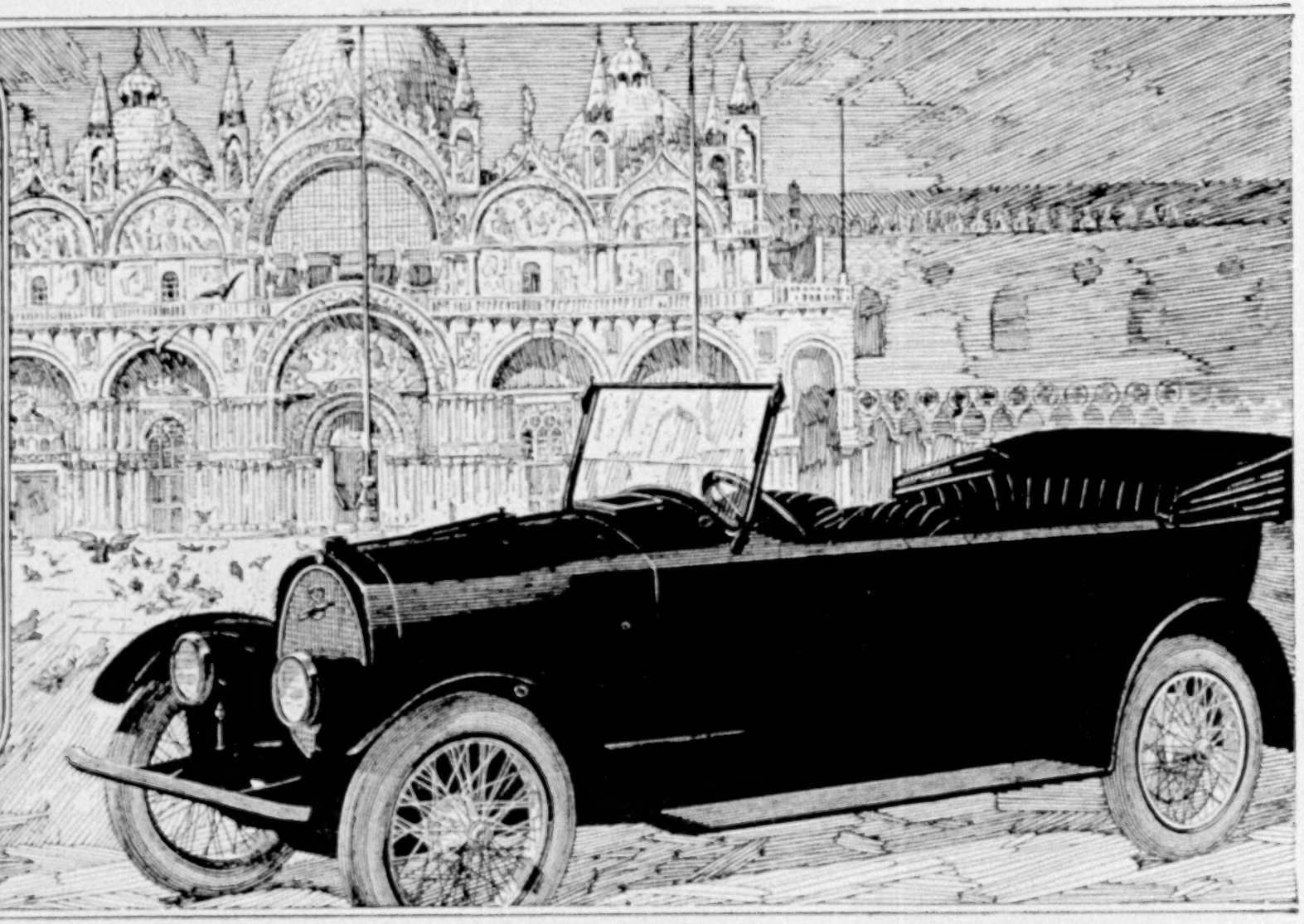
New York City



Refill With SANFORD'S

The Perfect Ink

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"Mention The Geographic—It identifies you"

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self protection demands that you should specify the best by name.

The best are—

POST TOASTIES

More *TOASTIES* are sold than any other brand of corn flakes, because they are superior in every sense.

Don't ask the grocer merely for corn flakes, ask for

POST TOASTIES

Made by Postum Cereal Company. Battle Creek, Mich.

Camels certainly give you everything you ever wanted in a cigarette. *They're a revelation!*

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YOUR highest ideal of cigarette enjoyment begins the day you get acquainted with Camel cigarettes! They win you on their quality.

Camels expert blend of choice Turkish and choice Domestic tobaccos is so new, so smooth and so fascinating *you'll prefer it to either kind of tobacco smoked straight!*

Camels are unique in so many other ways that appeal to smokers. They have a remarkable mildness, but that desirable "body" is *all* there! Again, Camels leave no unpleasant cigaretty aftertaste, no unpleasant cigaretty odor!

The real way to appreciate Camels best is to compare them puff-by-puff with *any cigarette in the world at any price!*

Camels are sold everywhere in scientifically sealed packages of 20 cigarettes for 20 cents; or ten packages (200 cigarettes) in a glassine-paper-covered-carton. We strongly recommend this carton for the home or office supply or when you travel.

R. J. REYNOLDS TOBACCO CO.
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SERIES 20

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BIG-SIX

America's Greatest Road Car

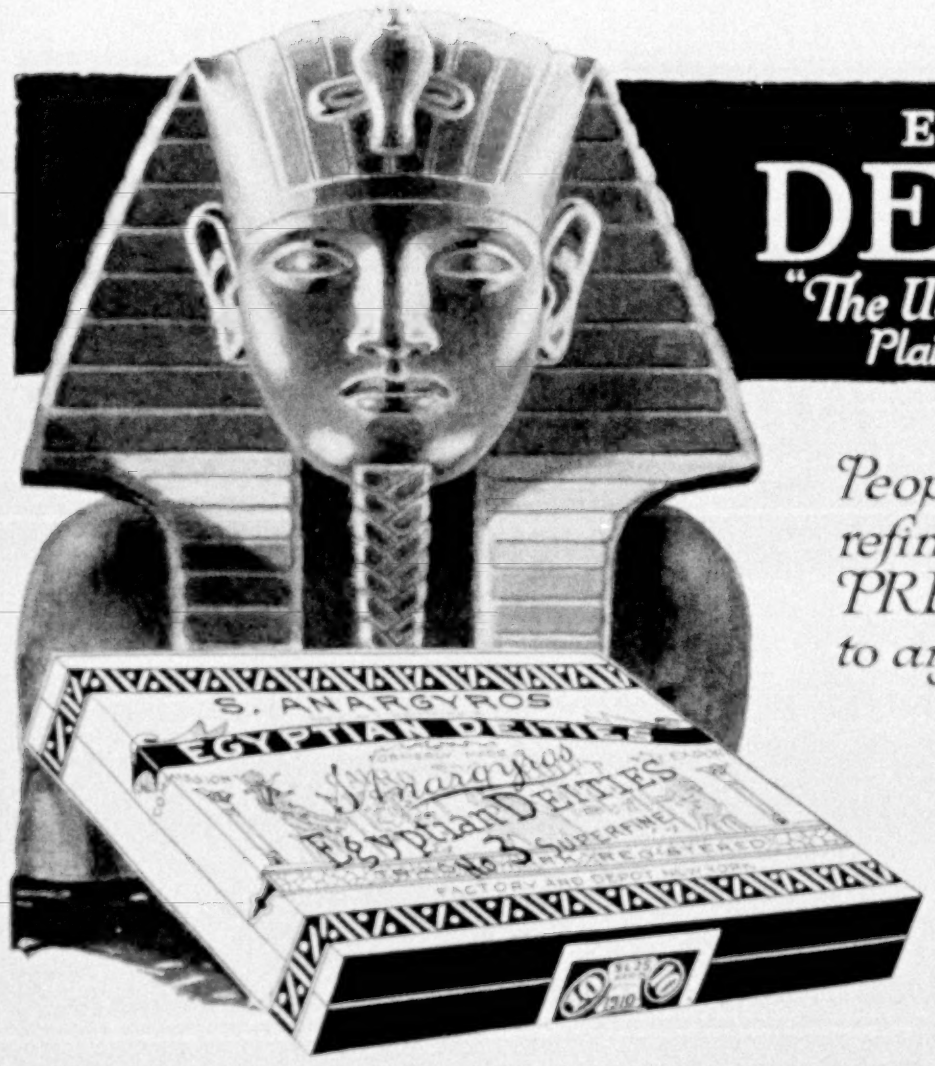
THE performance of the BIG-SIX may be equalled by few cars—it is *excelled* by *none.*

To drive the BIG-SIX is to actually experience a new motoring sensation. And such capabilities as this car possesses can be produced only by the mechanical excellence of the car itself.

Ride in the BIG-SIX—and be convinced.

126-inch wheelbase. Seven-passenger.
60-65-horsepower. Genuine leather upholstery.
Intermediate transmission. Cord tires.

"This is a Studebaker Year"



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"The Utmost in Cigarettes"
Plain End or Cork Tip.

People of culture and refinement invariably PREFER Deities to any other cigarette.

30¢

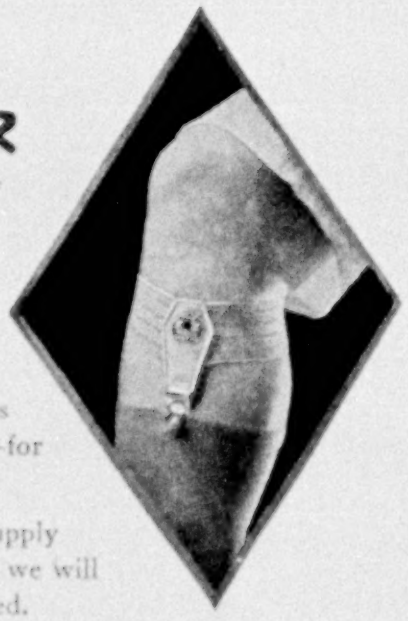
Anargyros
Makers of the Highest Grade Turkish and Egyptian Cigarettes in the World

Guaranteed Garter Comfort

The guarantee is binding, but the garters are not—there is no restriction upon leg muscles or circulation when you wear the

E.Z.
GARTER

"Wide for Comfort"

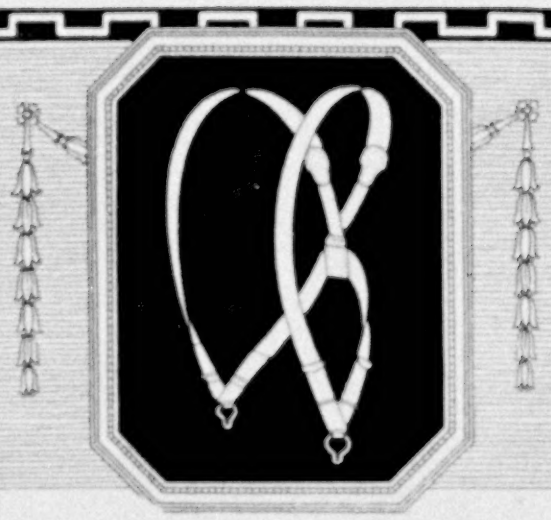


The wide, luxurious webbing makes binding impossible.

The E. Z. Garter is the ideal garter for dress wear—for sport wear—for any wear anywhere.

If your dealer cannot supply you, send his name and we will see that you are supplied.

THE THOS. P. TAYLOR CO.
DEPT. N BRIDGEPORT, CONNECTICUT

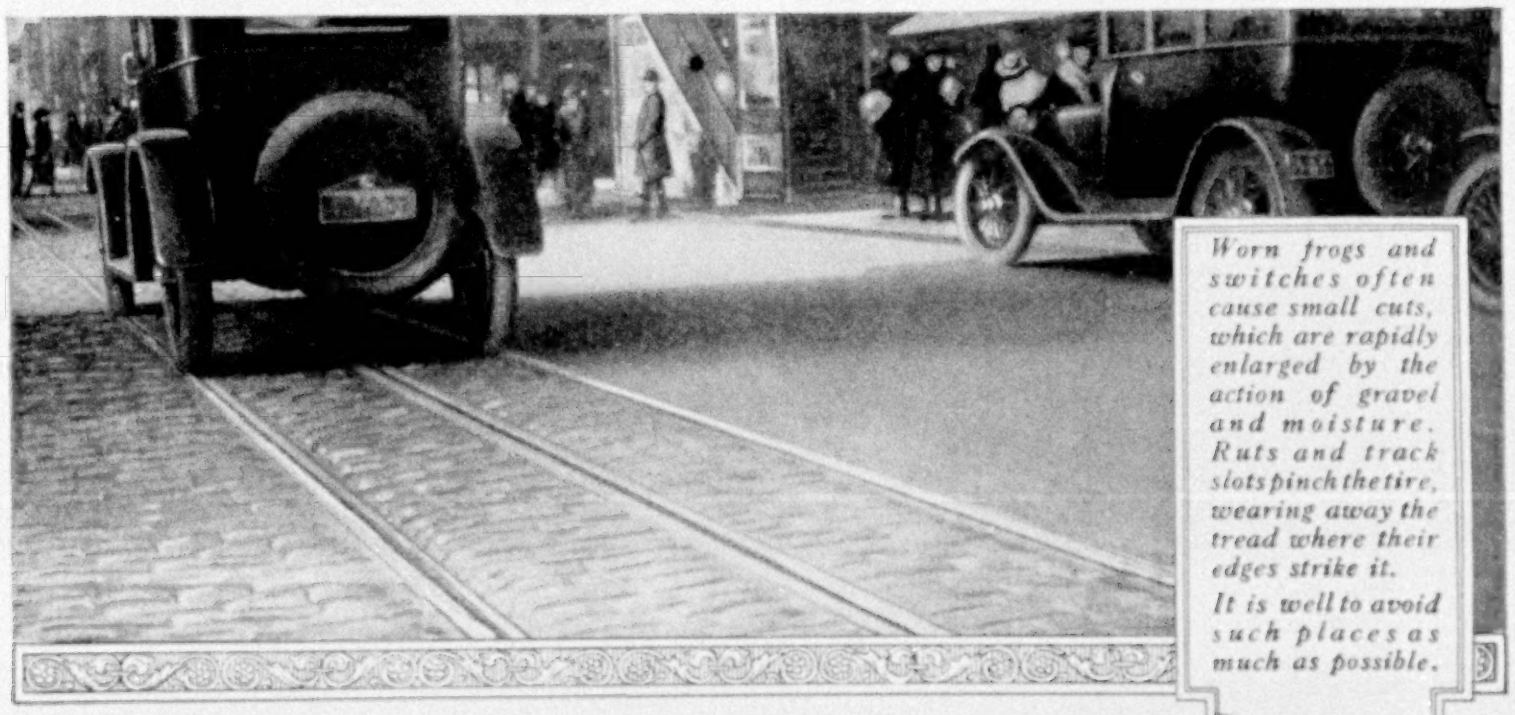


Kady Concealed Suspenders
Worn Under the Shirt

THE latest fashion in trousers support and—being Kady—the utmost in suspender comfort. Worn with or without belt. Avoid dangerous compression of abdomen caused by a tight belt. Support trousers with Kady Concealed and wear your belt loose. Easily fastened. Once you have enjoyed the comfort of Kady Concealed you will always want it. Fresh, live elastic.

At Leading Haberdasheries Everywhere

THE OHIO SUSPENDER CO., Mansfield, O.



Worn frogs and switches often cause small cuts, which are rapidly enlarged by the action of gravel and moisture. Ruts and track slots pinch the tire, wearing away the tread where their edges strike it.

It is well to avoid such places as much as possible.

Go to a Legitimate Dealer and Get a Legitimate Tire

THIS year the American people will spend more than $900,000,000 for automobile tires.

The cost is making even careless buyers think and inquire.

And the more they inquire, the smaller will grow the influence of hearsay and the irresponsible tire dealers.

* * *

We have all met the man who takes his opinions ready-made.

He tells everything he knows. He knows more about every car than the man who made it, where to buy the cheapest truck—how to get the biggest bargain in tires. He is the irresponsible dealer's greatest ally.

"Somebody says" and "everybody does" are responsible for more wrong impressions about tires than anything else you can think of.

* * *

What the thoughtful motorist is looking for is *better* tires. He goes to a legitimate dealer and gets a legitimate tire.

The *quality* idea—the idea of a quality tire, of a dealer who believes in quality—is commanding a greater respect from a larger portion of the motoring public all the time.

It is the idea on which the United States Rubber Company was founded—on which it has staked a greater investment than any other rubber organization in the world.

Build a *tire* that will *do more, a better tire than was built before,* and you are sure of a large and loyal following.

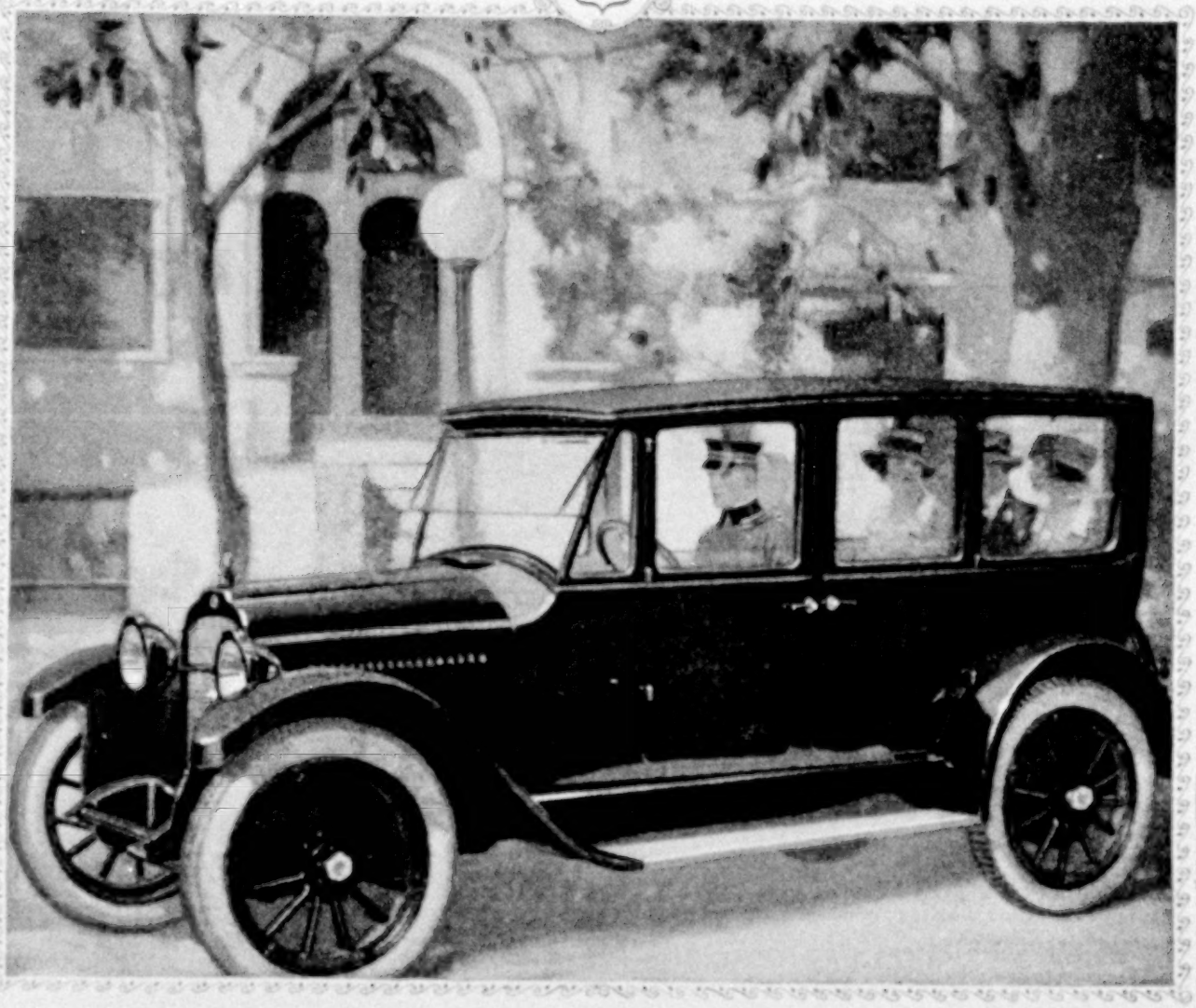
We have never been able to build enough U. S. Tires to go around.

United States Tires

United States Rubber Company

Fifty-three Factories The oldest and largest Rubber Organization in the World Two hundred and thirty-five Branches

"Mention The Geographic—It identifies you"



Entrance Grecian Embassy, Washington, D. C.

WILLYS-KNIGHT

IMAGINE a motor that runs each day as though its valves had just been tuned by the chief engineer of the factory that built the car. That is how Willys-Knight sleeve-valves operate. Their only change is *improvement with use.*

The positive, unvarying action of the Willys-Knight sleeve-valve motor and the steady improvement in its velvety operation account for the unvarying *daily* regularity of Willys-Knight performance.

A firm, rigid chassis gives solidity to the whole car and preserves it against the weakening and damaging influence of road strains.

Willys-Knight Booklet on Request

WILLYS-OVERLAND, INC., *Toledo, Ohio*

WILLYS-OVERLAND, LIMITED, *Toronto, Canada*

STEINWAY

The Instrument of the Immortals

IN those homes where the compositions of the Immortals are known and loved and kept living—where fine music is daily food for the soul—there you will find the Steinway. It is but natural that this, the piano of the Immortals—the choice of such men as Liszt and Wagner and Gounod—should be also the choice of those who know and love and cherish their music.

STEINWAY & SONS, Steinway Hall, 107-109 E. 14th St., New York

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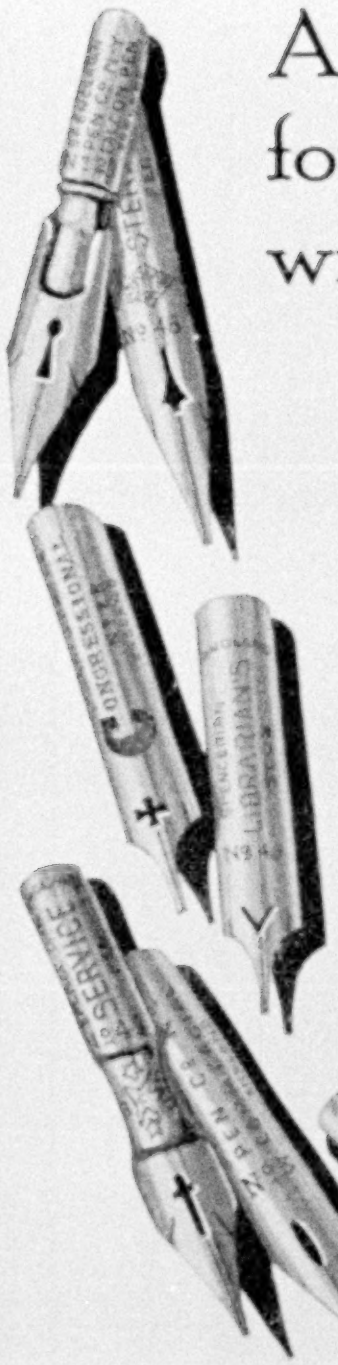

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Steel Pens

It's the special Spencerian steel and the finely worked, hand-made points that make Spencerian Pens last so long and write so smoothly. *Send 10c for 10 samples, different patterns.* Then pick a style that fits your hand. Use that style always. We will also include that fascinating book, "What Your Handwriting Reveals".

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Made of first-quality Black Press Board and of heavy Black or Terra Cotta Fiber.

Your stationer has them. If not, write us.

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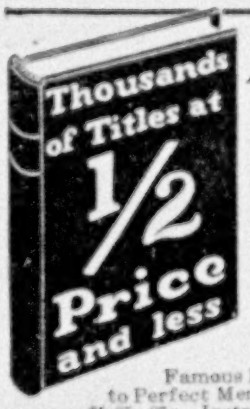

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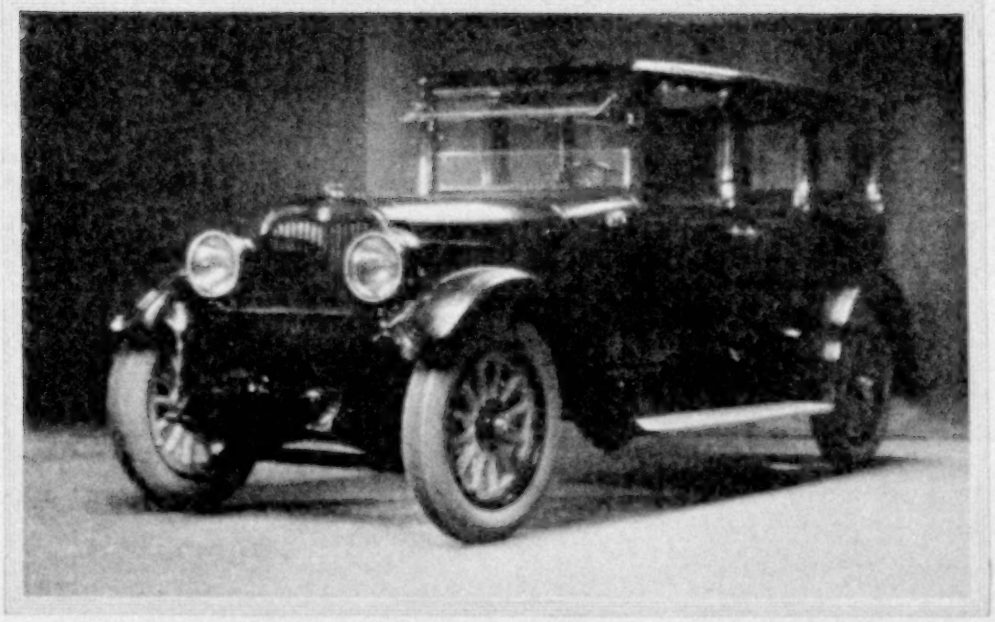
LAFAYETTE

IF YOU have been schooled in the ownership of fine automobiles, you have long known that engineering skill would some day culminate in a car like LaFayette.



That you would recognize it at once you knew intuitively; for it would possess certain intrinsic refinements which have often occurred to you vaguely and almost subconsciously in conjunction with your own car.

Mentally you endowed it with such pliant power and ease of motion as could be evolved only by the expert engineering proficiency this car enjoys.

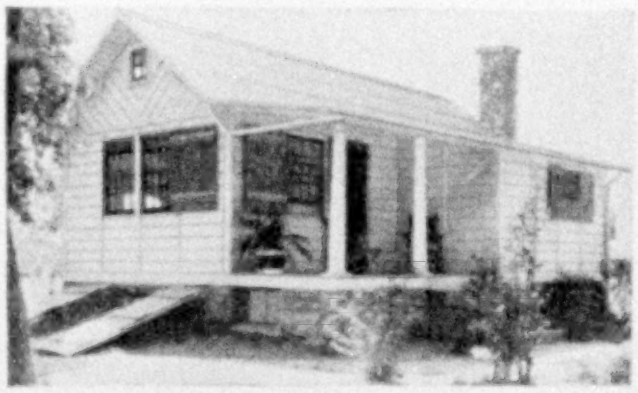
Those whose association with splendid cars has quickened their appreciation have been wholly won by their first sight of LaFayette.

In their eagerness for ownership they formed priority lists in many cities even before a price announcement had been made.

If you have owned one of the better motor cars and driven it a reasonably long time, it is not improbable that you, also, may want a LaFayette.

LAFAYETTE MOTORS COMPANY at *Mars Hill* INDIANAPOLIS

"Mention The Geographic—It identifies you"



Vacation Time Is Coming

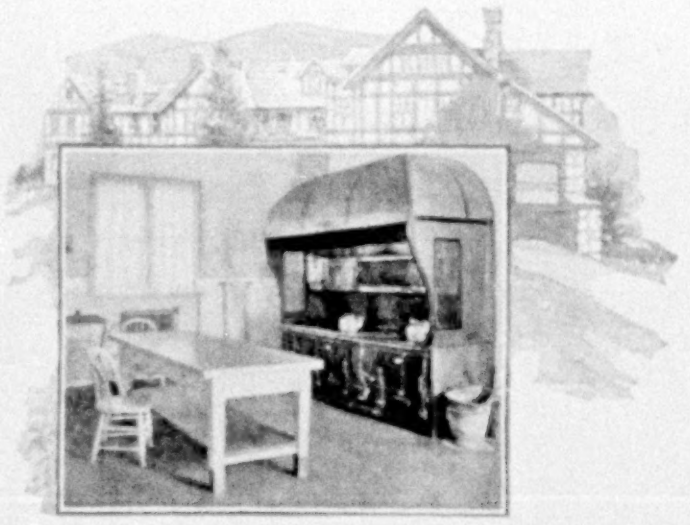
Start now to make plans for your stay in the mountains or for a whole summer of health and fun for yourself and children at the seashore.

Get a Pocono Hills Bungalow. Costs only $775. Substantially built; contains five rooms; is single-walled; exterior stained brown with creosote or, if preferred, painted white. The bungalow is shipped in sections and can be erected by any two persons, absolutely without experience.

Catalog showing full line of Bossert Houses mailed for 18c.

LOUIS BOSSERT & SONS, Inc.

1313 Grand Street — Brooklyn, N. Y.



Electric and Coal Range and Sanitary Table in the Home of A. L. Dommerich, Greenwich, Connecticut, C. P. H. Gilbert, Architect

DEANE'S FRENCH RANGE

Shown here is ready at the turn of a switch to give you instant heat. It will insure the highest character of kitchen service. *Deane's French Ranges*, built to order, are designed to burn all kinds of fuel and in any combination.

Ask your architect to specify *Deane's French Ranges* and write us for "The Heart of the Home," a portfolio of ranges in prominent American homes.

BRAMHALL-DEANE CO.

261-263 West 36th Street — NEW YORK

Sani-Flush

TRADE MARK REG. U. S. PATENT OFFICE

Cleans Closet Bowls Without Scouring

Keep the Toilet Spotless

Stains, incrustations and rust marks that make a closet bowl so unsightly and are so hard to get rid of, in the ordinary way, are promptly and thoroughly removed by Sani-Flush.

A little Sani-Flush sprinkled into the bowl, according to directions, will clean it more effectively than any other means—and with no unpleasant labor on your part. Sani-Flush makes every part of the bowl and trap spotlessly white, odorless and absolutely clean.

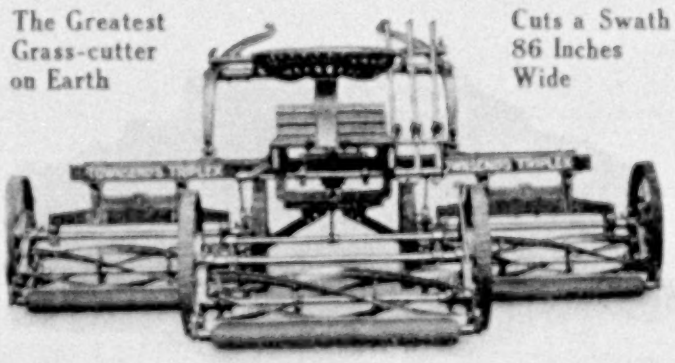
THE HYGIENIC PRODUCTS CO.
425 Walnut Avenue, Canton, Ohio
Canadian Agents:
HAROLD F. RITCHIE & CO., LTD., Toronto

Sani-Flush is sold at grocery, drug, hardware, plumbing, and housefurnishing stores. If you cannot buy it locally at once, send us 25c in coin or stamps for a full sized can postpaid. (Canadian price, 25c; foreign price, 50c.)

TOWNSEND'S TRIPLEX

The Greatest Grass-cutter on Earth

Cuts a Swath 86 Inches Wide



Floats Over the Uneven Ground as a Ship Rides the Waves

One mower may be climbing a knoll, the second skimming a level, while the third pares a hollow. Drawn by one horse and operated by one man, the TRIPLEX will mow more lawn in a day than the best motor mower ever made; cut it better and at a fraction of the cost.

Drawn by one horse and operated by one man, it will mow more lawn in a day than any three ordinary horse-drawn mowers with three horses and three men.

Does not smash the grass to earth and plaster it in the mud in springtime, neither does it crush the life out of the grass between hot rollers and hard, hot ground in summer, as does the motor mower.

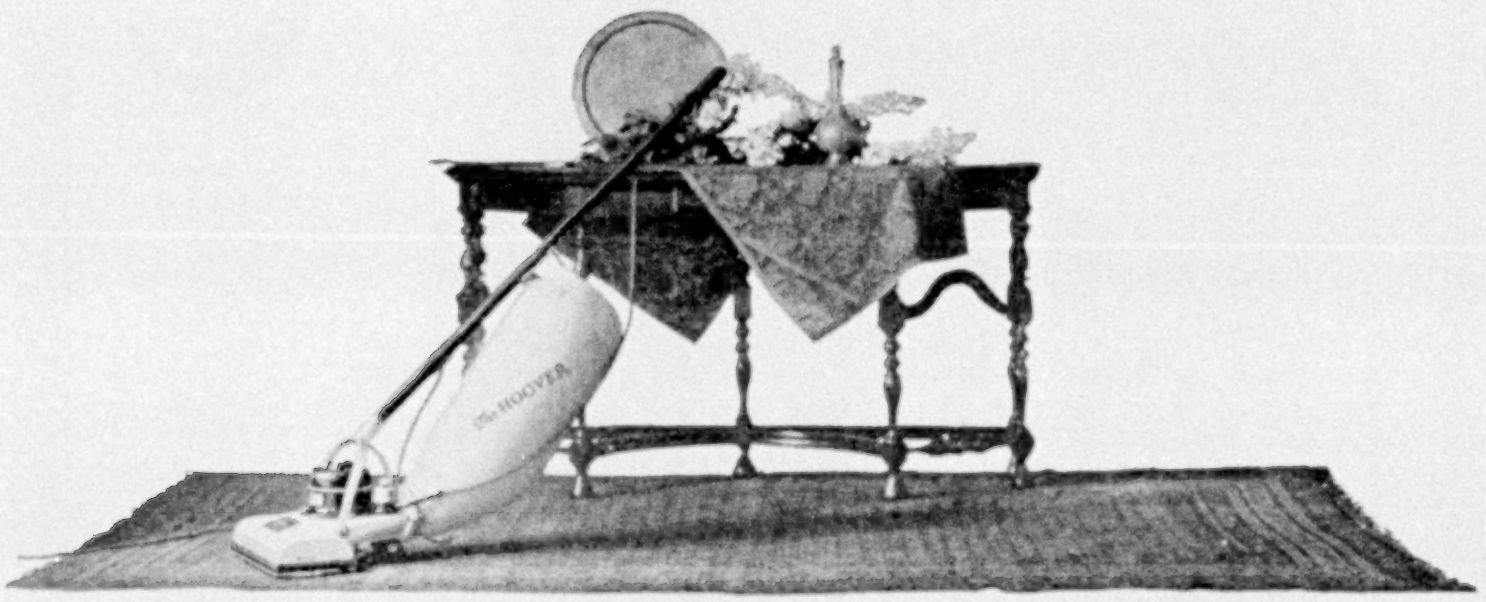
The public is warned not to purchase mowers infringing the Townsend Patent, No. 1,209,519, December 19th, 1916.

Write for catalog illustrating all types of Lawn Mowers.

S. P. TOWNSEND & CO.

27 Central Avenue — Orange, New Jersey

The Hoover lifts the rug from the floor, like this—flutters it upon a cushion of air, gently "beats" out its embedded grit, and so prolongs its life



Every rug is a constant collector of three kinds of dirt: embedded grit, clinging litter and surface dust. Three cleaning processes, therefore, are constantly necessary. Only The Hoover performs the three at once. It gently beats, to dislodge all the destructive embedded grit. It swiftly sweeps, to detach all the stubbornly adhering litter. It powerfully suction cleans, to withdraw all loose surface dirt. And it is the largest selling electric cleaner in the world.

The HOOVER

It Beats—as it Sweeps—as it Cleans

THE HOOVER SUCTION SWEEPER COMPANY
The oldest makers of electric cleaners
North Canton, Ohio Hamilton, Canada

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ADDS LIFE TO PAINT

To make every sweep of the brush deliver utmost value, the paint you manufacture, sell, buy, or use should contain Zinc Oxide.

The tint, lustre, resistance against dirt and weather are improved—the very life of the paint is lengthened, by Zinc Oxide. Zinc paint provides a surface impervious to moisture, easy to wash and clean, and protected against rapid deterioration. The extreme fineness of Zinc Oxide gives to paint greater covering capacity, greater hiding power, and longer years of service.

For years we have made it possible for paint-makers to obtain Zinc Oxide of the quality that best serves their purposes. Our more than 70 years of work with zinc enables manufacturers, in scores of greatly diversified fields, to better their commodities through the use of New Jersey Zinc.

Extensive stocks of those zinc products used by the paint trade are carried in conveniently located warehouses.

THE NEW JERSEY ZINC COMPANY, *160 Front Street*, New York

ESTABLISHED 1848

CHICAGO: Mineral Point Zinc Company, 1111 Marquette Building
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Manufacturers of Zinc Oxide, Slab Zinc (Spelter), Spiegeleisen, Lithopone, Sulphuric Acid, Rolled Zinc Strips and Plates, Zinc Dust, Salt Cake and Zinc Chloride

The world's standard for Zinc products

New Jersey
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THE MOST BEAUTIFUL CAR IN AMERICA

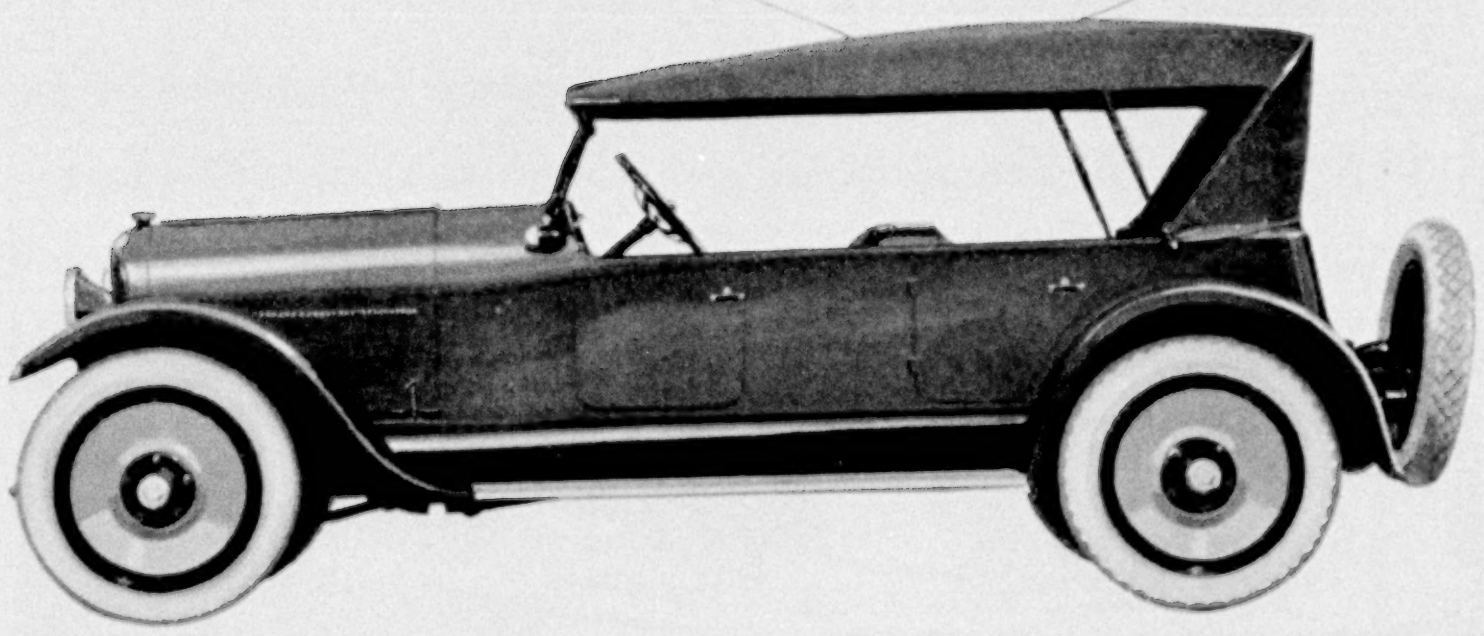
THE "Larchmont" Four-passenger Model has been called the ideal "Young Man's" Car, but it appears to have just as many friends among the older folks.

It is smart—there can be no question about that—but it is the smartness of good taste and refinement. It both looks and acts the part of a thoroughbred.

Please remember that the production schedule on this model is limited. Our dealer will be in much better position to meet your requirements in regard to delivery if you place your order now.

PAIGE-DETROIT MOTOR CAR CO.
DETROIT

Manufacturers of Motor Cars and Motor Trucks



"The Vacation Land of Perfect Climate"

HIGHLANDS *of* ONTARIO

HAY FEVER unknown. One thousand to two thousand feet above the sea. Air scented with pine and balsam. Modern hotels in Algonquin Park, Muskoka Lakes, Georgian Bay, Lake of Bays, Kawartha Lakes and Timagami. A short pleasant ride from Toronto, and you are in the midst of a charming summer playground. Fishing, boating, bathing, golf, and the great out-of-doors. ***Write for free illustrated literature.***

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A. B. CHOWN, Desk "C"
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To Re-Welcome Outdoor Friends

Wild Animals of North America

The Little and Big
Denizens of Dooryard,
Park, and Forest

The 127 full-color plates and many other illustrations and delightful text enable one to recognize and enjoy the animals in near-by woodland or to track in imagination American big game in distant wilds. *Illustrated circular on request.*

Stiff or Flexible Covers, $3.00, postpaid in U. S. A.

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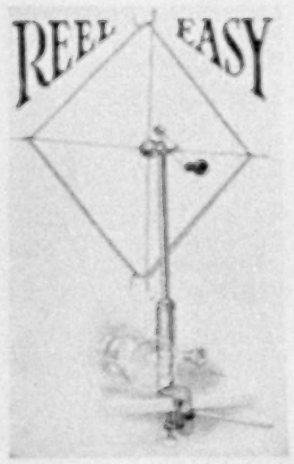

Every turn takes up 40 inches of line

DRY YOUR LINES!

Every Fisherman needs this light, compact dryer. No more tangled, rotted lines or dropping and breaking reels.

The "REEL EASY" can be attached to a board or table, spider taken off, line washed and dried and extra spider put on ready for use.

Every fishing club should have one for use of all members. Packed in box 10½" x 4½" x 1½". Sent postpaid, complete, with one spider. Extra spiders 50 cents each. **$5.00**

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L. T. WEISS, Mfr.
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128 Color Portraits of "Man's Best Friend" are in the

Book of Dogs

$2.00, Postpaid in U. S. A.

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Earned its reputation by "mouth to mouth" advertising

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The Columbia All-Star Exclusive Opera Cast

All the efforts of the managers to get great opera casts together have never equaled this combination of world-famous opera stars who make records for Columbia exclusively.

All that's entrancing, all that's inspired in the whole enchanted realm of Grand Opera is yours upon Columbia Records.

They give you the music of many lands, arias, duets, quartettes and choruses, sung by the operatic stars whose singing has made this music immortal.

"Springtime is Wingtime"

The Book *of* Birds

250 Matchless Color Pictures

The delight of all who would identify, photograph, attract or fully enjoy their feathered neighbors. A lovely gift.

Enricher of Dooryard, Park and Woodland

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JOHN·POLACHEK·
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476 HANCOCK ST., LONG ISLAND CITY, N. Y.

A Most Wonderful Place

For its size, a beehive is the most wonderful place in the world. Maeterlinck's "The Life of the Bee" describes a natural wonder that is almost beyond belief. Read it if you haven't. Keeping a few bees will prove these wonders to you—keep you outdoors—give you a restful, invigorating recreation of absorbing interest. Besides, there is a cash profit, and a pure, golden sweet for your table that you produce yourself. Write and tell us your occupation and if you have ever kept bees. We will send you a free booklet, "Bees for Pleasure and Profit." It explains a fascinating small industry for town or country.

THE A. I. ROOT COMPANY
(Fifty Years in the Beekeeping Business) 2N
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Not Merely a Bird House —But "A Bird Homestead" It's the DODSON

The Dodson Bird House attracts and wins the birds, and it's the same Dodson House to which the same little songsters return every year. A study of bird life has shown that returning birds, with uncanny accuracy occupy the house they left in the Fall, if it is there.

The sturdy Dodson House is there—just as strong, but more inviting; as it has aged. Constructed of thoroughly seasoned Red Cedar, Oak, Cypress, and selected White Pine, nails and cleats coated to resist rust, painted with strictly pure lead and oil, permanency is assured.

Order Now Songbirds protect trees, shrubs, and flowers from insects,

Mr. Dodson will supervise proper location for his houses, insuring success, if transportation and expenses are provided.

Dodson Colonial Martin House
56 Compartments 26 in. Wide
38 in. Long 44 in. High
6-inch Porch All Around

Free Bird Book—Sent on Request—illustrating Dodson Line, giving prices; also beautiful colored bird picture free

Joseph H. Dodson, *President American Audubon Association* 702 Harrison Avenue, Kankakee, Illinois

Dodson Sparrow Trap guaranteed to rid your community of these quarrelsome pests. Price $5.00 47

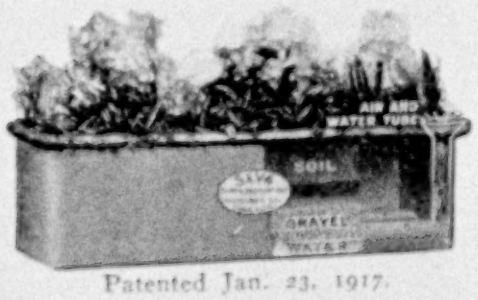
DREER'S 1920 GARDEN BOOK

contains 224 pages, six splendid color plates, besides numberless photographic true-to-life reproductions. It lists all the standard varieties of vegetables and flowers, as well as the best of the novelties, and tells how to grow them.

The newest Roses, Dahlias and Hardy Perennials are given special prominence.

Mailed free to any one mentioning this magazine.

HENRY A. DREER 714-16 Chestnut St. Philadelphia, Pa.



Patented Jan. 23, 1917.

The SĀVŌ Steel
ALL-YEAR-ROUND FLOWER BOX

Self-Watering and Sub-Irrigating

For Windows, Porches, Ledges, Sun Parlors, etc. Leak Proof and Rust Proof. No surface watering. Move Savo Boxes indoors or outdoors and have beautiful Flowers and Plants the year round.

Write for FREE Catalog

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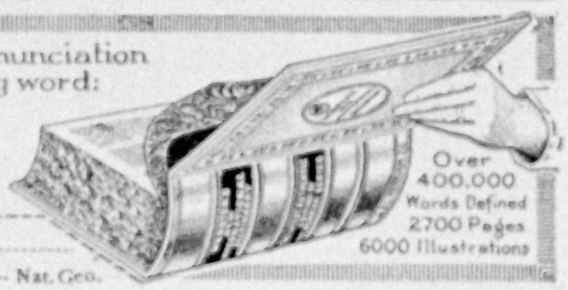
Whatever your question;—be it the pronunciation of Bolsheviki; the spelling of a puzzling word: the location of Zeebrugge, the meaning of blighty, ace, tank, etc., this Supreme Authority contains an accurate, final answer.

G. & C. MERRIAM CO., SPRINGFIELD, MASS. REGULAR AND INDIA-PAPER EDITIONS



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The Best In Travel — The Best In Travel

Verdun: You cannot really see the Battlefields of "American France" unless you have a room in Verdun for your headquarters. "You won't get rooms at Verdun," say experienced travelers. True—unless you have secured, made certain, today your headquarters in

Verdun in April, May, June, July, and so on through 1920. We have done this for you. All through 1920 we will have rooms—good rooms, clean rooms, Raymond-Whitcomb Rooms—for every member of a Raymond-Whitcomb Tour to Europe; but

Verdun is more than the military "Key to Victory," more even than the "Heart of American France;" it is the center of all travel to the lines held by nearly 1,000,000 American boys, including the scenes of the desperate fighting in the Argonne-Meuse and the St. Mihiel salient.

Verdun is only one example of Raymond-Whitcomb foresight and service in providing for the satisfaction and comfort of Americans who wish to visit Europe during the exceptional conditions which prevail in 1920. Our standards are still **"the best in travel."**

Verdun, moreover, is only one point in our varied Tours to Europe, which will include Paris, the French and English Battlefields, Belgium, Alsace-Lorraine, the Riviera, Chateau Country, Provence, England, Holland, Switzerland, Italy, Spain, Algeria, Tunisia, and Sicily.

SAILING DATES FOR EUROPEAN TOURS

April 3, April 17, May 1, May 15, May 29,
June 12, and June 26 (several tours on each date).

OTHER TOURS TO ALL PARTS OF THE WORLD

California, National Parks, Pacific Northwest, Alaska,
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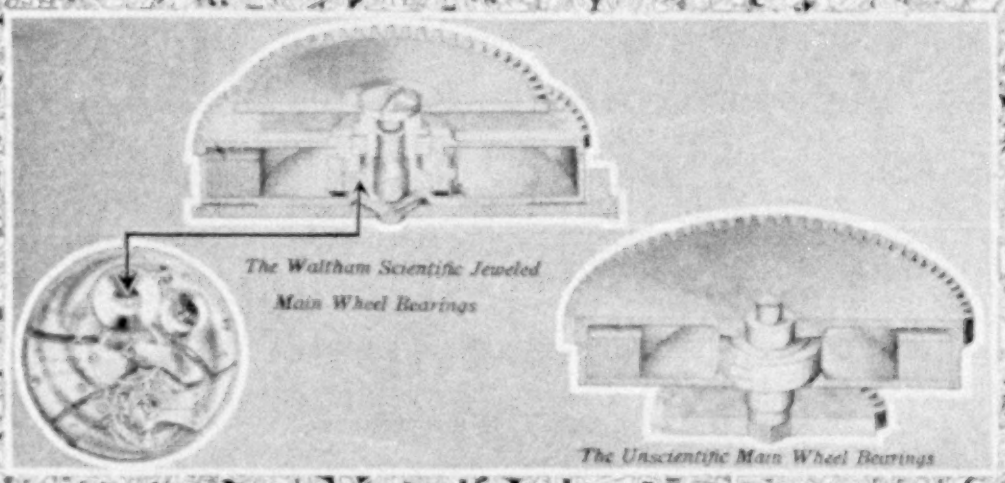


THE MOST SCIENTIFICALLY BUILT WATCH IN THE WORLD

Waltham Scientific "Jeweled Main Wheel Bearings" that Mean So Much to You in Time-keeping Accuracy

EVERY mechanically moving unit of any machine must have a bearing, and the freedom of that movement depends upon the scientific development of that bearing.

This is true of an oxcart, the Liberty Motor, or a watch.

The Waltham Watch Bearings are the most scientifically developed bearings in the realm of mechanics.

The time-keeping performance of a good watch starts at its power plant, the mainspring. And it is an axiom of mechanics that the greatest friction is at the point where the power *is the greatest.*

That watch is the best watch where the resisting factor of friction is the least prevalent.

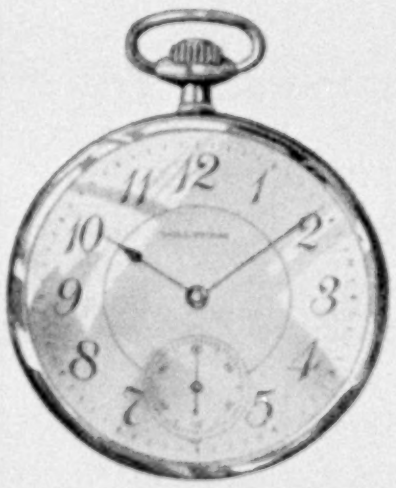
Look at the two illustrations in this advertisement. Here are portrayed sectional views of the Waltham scientific jeweled main wheel bearings and also of the unjeweled bearing method.

You will note that in the unjeweled bearing the shaft or barrel arbor is running in a hole drilled through the barrel container. This supplies only a bearing of brass for the rotation of the steel arbor, causing a greater resistance to the power of the mainspring, variable time-keeping, and eventually becomes charged with gritty particles that destroy the highly polished surface of the shaft or barrel arbor.

Whereas in the Waltham scientifically jeweled main wheel bearings we see developed a bearing composed of two highly polished sapphire jewels which are so set in the barrel that the superbly finished steel arbor rotates in them, distributing the power of the mainspring to the train with an irreducible minimum of friction.

This is not all. Every Waltham mainspring is contained in a specially hardened and ground steel barrel which protects the "works" if the mainspring should break. This exclusive Waltham feature also provides more room for a *longer* mainspring, consequently the motive power is better distributed and a more even time-keeping performance is assured.

It is these little things, yet vitally important, hidden in the "works" of the watch that provide unanswerable argument why your watch selection should be a Waltham.



The Riverside

The most dependable moderate price watch in the world

$75 and up

This story is continued in a beautiful booklet in which you will find a liberal watch education. Sent free upon request. Waltham Watch Company, Waltham, Mass.

WALTHAM

THE WORLD'S WATCH OVER TIME

SHEAFFER'S

PEN·PENCIL·INK

Pencil No. CB, gold filled, straight line, $4.00

$2.50 to $50

IN less than seven years the SHEAFFER Fountain Pen has come to be the leading seller in America's prominent stores because it has surprised the most skeptical, proving to be positively non-leakable and to maintain a perfectly even flow of ink, which starts the very instant the pen-point touches paper. This fulfillment of the theory of fountain-pen writing has been achieved only through SHEAFFER inventions, fully protected by patents.

Pen illustrated is number 49C, plain holder, ebony finish, with 14K gold band on cap, $9.50

Write for Booklet illustrating styles at all prices

W. A. SHEAFFER PEN CO.

Sheaffer Building, Ft. Madison, Iowa
New York Chicago Kansas City
San Francisco

PRESS OF JUDD & DETWEILER, INC.
WASHINGTON, D. C.

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WASHINGTON, D. C.

Reproduced from an old woodcut in the library of the Gruen Watchmakers Guild

From Pocket Sundial *to* Gruen Verithin *the* GUILD WATCHMAKING ART *Has Progressed*

POCKET sundials must have been in quite general use during Shakespeare's time, for Jaques, in "As You Like It," remarks, "And then he drew a dial from his poke."

It seems quite certain that the early clockmakers' guilds evolved the pocket sundial as the first portable timepiece. Although valueless on cloudy days, the courtiers of this early period took great pride in the ostentatious display of their dials.

In the mountainous cantons of Switzerland the art of the watchmaking guilds attained its fullest development. There, it seems probable, the early pocket dials were made, later to be superseded by the pocket watch. There the masters of the guilds dedicated their lives to their work, and passed down their art, a priceless heritage, to their sons and grandsons.

Today the Gruen Verithin Is *Made Where Once the Sundial* Measured *Time*

In the Gruen workshops at Madre-Biel, Switzerland, the Gruen Verithin is made. Here, with the aid of the most modern American machinery, master craftsmen fashion the Gruen movements —and here these artisans, with the same skill and devotion as was possessed by the masters of old, do what no machine can do—finish by hand and adjust each movement to the exacting standards of Gruen Precision accuracy.

On Time Hill, Cincinnati, is the American workshop of the Gruen Guild where the hand-wrought cases are made, and the movements inserted and given final adjustment. Here, also, is maintained a *real* service workshop, where standardized duplicate repair parts are always on hand for prompt delivery to any jeweler in America.

You may see the Gruen Verithin at one of the 1,200 jeweler agencies, the best in each locality, to whom the sale is confined. Look for the Gruen Guild Emblem displayed in the store windows of all Gruen agents. Remember, however—not every Swiss watch is a Gruen.

Write for the Gruen Guild Exhibit

A book of Etchings and Photographic Plates showing Gruen Guild Watches for men and women will be sent if you are sincerely interested.

GRUEN WATCHMAKERS GUILD
Time Hill, Cincinnati, O.
Makers of the famous Gruen Watches since 1874
Canadian branch, Toronto, Can.

PATENTED

A popular Gruen Verithin Model, the Louis XIV

How the Gruen Pat. Wheel Construction made an accurate watch thin

The shortness of staff makes watch more durable

District Gruen Models, $215 to $825; Ultrathin Models, $225 to $800; Very-Verithin Models, $60 to $250; Verithin Models, $60 to $250; Thin Models, $27 to $60; Men's Strap Models, $27 to $250; Ladies' Wrist Models, $27 to $275; with full cut AAI diamonds, up to $4,000.

GRUEN Guild Watches